



# **Lake Holloman Recreational Area Development Environmental Assessment**



**Holloman Air Force Base, New Mexico  
49<sup>th</sup> Fighter Wing**

**August 2009**

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## ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	NAAQS	National Ambient Air Quality Standards
49 FW	49th Fighter Wing	NAGPRA	Native American Graves Protection and Repatriation Act
ACAM	Air Conformity Applicability Model	NEI	National Emissions Inventory
ACC	Air Combat Command	NEPA	National Environmental Policy Act
ACHP	Advisory Council on Historic Preservation	NHPA	National Historic Preservation Act
ACM	Asbestos-Containing Material	NMED	New Mexico Environment Department
AFB	Air Force Base	NO <sub>2</sub>	Nitrogen Dioxide
AFI	Air Force Instruction	NO <sub>x</sub>	Nitrogen Oxides
AICUZ	Air Installation Compatible Use Zone	NPDES	National Pollutant Discharge Elimination System
Air Force	United States Air Force	NRCS	Natural Resources Conservation Service
AIRFA	American Indian Religious Freedom Act	NRHP	National Register of Historic Places
AST	Aboveground Storage Tank	NSR	New Source Review
AT/FP	Anti-Terrorism/Force Protection	O <sub>3</sub>	Ozone
ATV	All Terrain Vehicle	OHV	Off-Highway Vehicle
BLM	Bureau of Land Management	Pb	Lead
BMP	Best Management Practice	PCB	Polychlorinated Biphenyl
CAA	Clean Air Act	PM <sub>10</sub>	particulate matter less than 10 microns in diameter
CEQ	Council on Environmental Quality	PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	ppm	parts per million
CFR	Code of Federal Regulations	ppt	parts per thousand
cfu	Colony Forming Units	PSD	Prevention of Significant Deterioration
CO	Carbon Monoxide	RCRA	Resource Conservation and Recovery Act
CWA	Clean Water Act	ROI	Region of Influence
dB	decibel	RPM	Revolutions per Minute
dba	A-weighted decibel	RV	Recreational Vehicle
DNL	Day-Night Average Sound Level	SF	Square Feet
DO	Dissolved Oxygen	SHPO	State Historic Preservation Office
DoD	Department of Defense	SIP	State Implementation Plan
EA	Environmental Assessment	SO <sub>2</sub>	Sulfur Dioxide
EIAP	Environmental Impact Analysis Process	SO <sub>x</sub>	Sulfur Oxides
EMNRD	Energy, Mineral, and Natural Resources Department	SWDA	Solid Waste Disposal Act
EO	Executive Order	SWPPP	Stormwater Pollution Prevention Plan
ERP	Environmental Restoration Program	TDS	Total Dissolved Solids
ESA	Endangered Species Act	U.S.	United States
ETR	Engine Thrust Request	UAS	Unmanned Aerial System
FY	Fiscal Year	UFC	Unified Facilities Criteria
HAZMART	Hazardous Material Facility	USACE	United States Army Corps of Engineers
HMMP	Hazardous Material Management Process	USC	United States Code
Hz	Hertz	USDA	United States Department of Agriculture
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning	USEPA	United States Environmental Protection Agency
INRMP	Integrated Natural Resource Management Plan	USFWS	United States Fish and Wildlife Service
kV	Kilovolt	UST	Underground Storage Tank
L <sub>max</sub>	maximum sound level	VOC	Volatile Organic Compound
mg/L	milligrams per liter	WWTP	Wastewater Treatment Plant
mL	milliliter		
MLRA	Major Land Resource Area		
MVA	mega volt-ampere		

**LAKE HOLLOMAN RECREATIONAL AREA DEVELOPMENT AT  
HOLLOMAN AIR FORCE BASE (AFB), NEW MEXICO  
FINDING OF NO SIGNIFICANT IMPACT**

**DESCRIPTION OF THE PROPOSED ACTIONS AND ALTERNATIVES**

49<sup>th</sup> Fighter Wing (49 FW), located at Holloman AFB, proposes to undertake additional development in and near the Lake Holloman and Lagoon G Complex to support increased recreational activities. The proposal would involve the construction of camping and picnic areas; nature trails; restrooms and recreational vehicle (RV) facilities; and would allow for additional activities such as boating, fishing, and all-terrain vehicle (ATV) use, as well as enhance existing bird watching opportunities. The recreation area would be accessible to both Holloman-based personnel and members of the surrounding community.

Alternative A would be the same as the Proposed Action except that fishing would not be permitted in Lagoon G or Lake Holloman.

The No Action Alternative would continue the current use of Lake Holloman as an uncoordinated recreational area. Under the No Action Alternative, Holloman AFB personnel would continue to recreate at more distant locations such as Elephant Butte, Inn of the Mountain Gods, Caballo Lake, or small private lakes in the Cloudcroft and Ruidoso areas.

**SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

**Proposed Action and Alternatives:** This Environmental Assessment (EA) provides an analysis of the potential environmental consequences during the construction of Proposed Action and the No Action Alternative. Eleven resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0 of the EA, none of the alternatives would result in significant environmental impacts to any area.

**Noise:** Noise resulting from ongoing Holloman AFB aircraft operations may be disruptive to proposed recreational activities. Camping, in particular, could be problematic on nights when Holloman AFB is flying late-night missions. Noise impacts would be limited to annoyance. Noise from ATVs may be disturbing to wildlife, particularly birds during nesting season.

**Safety:** Standard safety practices would minimize risks associated with construction of the proposed facilities. In order to assure the safety of the public and United States Air Force personnel utilizing the Lake Holloman complex, emergency communication, and a Visitor Access Control Station should be provided. Additionally, fishing and ATV educational programs should be implemented and additional signage provided to educate the patrons of potential dangers they may encounter while on-site. Clay soils in the project area are extremely slippery during and after rain events and accidents have been experienced as a result of this condition in the past. ATVs would be permitted in accordance with safety requirements established by New Mexico state laws as well as the Holloman AFB Safety office. Protective equipment and designated safety apparel would be required for all ATV and off-road vehicle operators.

**Air Quality:** The Alamogordo area is in air quality attainment for all criteria pollutants. Temporary construction emissions would produce localized short-term elevated air pollutant concentrations. No change is projected to air quality within the Alamogordo area and no conformity determination is required.



**Earth Resources:** Clay soils in the project area are extremely slippery during and after rain events and accidents have been experienced as a result of this condition in the past. Improved road surfaces, gravel, and mulch, would be added as part of the Proposed Action, partially alleviating this potential problem. Erosion of unimproved areas, as a result of increased foot, ATV, and vehicle traffic could result in more potentially slick ground surface area. The Lake Holloman and Lagoon G Complex is an area typical of the Tularosa Basin and Best Management Practices (BMPs), erosion and sediment controls, and storm water management measures would be implemented to minimize soil erosion.

**Physical Resources:** Subject to approval by Headquarters Air Combat Command (ACC), garbage and recycling receptacles would be placed at the new facilities for the group pavilion and camping sites. Garbage and recycling would be collected and disposed in accordance with Holloman AFB Solid Waste Management Plan. Any hazardous wastes generated during construction or operation of the proposed facilities would be handled in accordance with the Holloman AFB Solid and Hazardous Waste Management Plans.

**Biological Resources:** Standard erosion control and soil stabilization BMPs would be implemented during and following construction. Construction would not occur in wetlands. Native species would be used for re-seeding and planted as shade trees. Increased noise and human presence could potentially affect five state-listed bird species and one federal species of concern (snowy plover). Effects would be particularly strong during nesting season. Signs and kiosks will also be posted along the boundaries of known nesting areas to notify visitors and ATV operators of prohibited areas and educate them on the importance of the wildlife habitat and the ways to minimize impacts on the species. Other wildlife species may be displaced by increased human presence in the area. Activities in the area may affect, but are not likely to adversely affect, threatened and endangered species potentially located within the Lake Holloman/Lagoon G Complex.

**Water Resources:** Preliminary analysis of existing water quality data for Lake Holloman suggest that water quality standards for wildlife habitat, aquatic life, and secondary contact (e.g., boating, fishing) are met, however *E. coli* samples suggest that primary contact standards are exceeded (e.g., swimming). Upon completion of their testing and analysis, the State of New Mexico will make a determination as to suitability of the lake for recreation involving secondary contact. Primary contact or swimming would not be permitted in either Lake Holloman or Lagoon G. In addition, non-motorized boats only would be permitted as water quality may not be suitable for operation of powered watercraft due to potential for extreme scaling of mechanical parts. Implementation of a Storm Water Pollution Prevention Plan (SWPPP) may be required showing how the implementation of appropriate BMPs would prevent erosion, control sediment loss, and keep other pollutants from running off site as a result of construction. Construction would avoid wetlands delineated in the 1996 wetland delineation completed by the United States Army Corps of Engineers (USACE). Should planned future wetland or floodplain delineations reveal the presence of additional wetlands or floodplains, these areas would be avoided during facility construction.

**Cultural Resources:** None of the properties or options associated with the Proposed Action would affect historic structures on Base. No culturally significant or archaeological sites have been identified in the project site.



**Transportation:** Under the Proposed Action, development of recreational activities at Lake Holloman would be expected to result in increases to the number of people visiting the lake. Several of the gravel roads within the project area would be upgraded to provide improved accessibility.

**Infrastructure:** The proposed facilities would require only minimal infrastructure additions (e.g., water, electricity, communications). No utilities system capacities would be exceeded.

**Socioeconomics:** Construction expenditures would have a temporary beneficial effect on the local economy. Additional benefits would be derived from the proposed boat rentals which would be an extension of the boat rentals currently provided by the Services Flight at Holloman AFB.

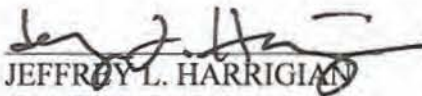
**Environmental Justice:** The Proposed Action would provide additional recreational opportunities to minorities and/or low-income populations, as well as children.

**Alternative A:** Impacts under Alternative A would be similar to those described for the Proposed Action. Excluding fishing from Lagoon G and Lake Holloman would result in slightly lower levels of human activity in the area. These activities would not be expected to result in any significant impacts.

**No Action Alternative:** Under the No Action Alternative, recreational area development would not occur and no impacts to any resource area would occur.

## CONCLUSION

Based on the analysis in the EA which is hereby incorporated by reference, no significant impact is anticipated from the implementation of the Proposed Action, Alternative A, or the No Action Alternative. Therefore, issuance of a Finding of No Significant impact (FONSI) is warranted, and an environmental impact statement is not required. As funding becomes available, each project would be reviewed by the 49 CES/CEA (Environmental Flight) prior to implementation to ensure that there has not been a substantial change in project scope, significant new circumstances or information relevant to environmental conditions/regulations warranting reevaluation of potential environmental consequences. Should there be a substantive change in scope, conditions, or regulations, the base will pursue additional environmental impact analysis process (EIAP) using an interdisciplinary approach.

  
JEFFREY L. HARRIGAN  
Colonel, USAF  
Commander

22 Aug 09  
DATE



**LAKE HOLLOMAN  
RECREATIONAL AREA  
DEVELOPMENT  
ENVIRONMENTAL ASSESSMENT**

**HOLLOMAN AIR FORCE BASE,  
NEW MEXICO**

**49<sup>TH</sup> FIGHTER WING**

**AUGUST 2009**





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# EXECUTIVE SUMMARY

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This Environmental Assessment (EA) describes the potential environmental consequences resulting from a proposal by the 49<sup>th</sup> Fighter Wing (49 FW) to undertake development of a recreational area for the Lake Holloman area located at Holloman Air Force Base (AFB), New Mexico.

## ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA has been prepared by the United States Air Force (Air Force), Air Combat Command (ACC) and the 49 FW in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA, and Air Force Instruction (AFI) 32-7061 (*The Environmental Impact Analysis Process* [EIAP], as codified in 32 Code of Federal Regulations [CFR] Part 989).

## PURPOSE AND NEED FOR ACTION

The purpose of this action is to undertake development to Lake Holloman and the Lagoon G areas on Holloman AFB. The Proposed Action involves development of a lakeside recreation facility within the Lake Holloman and Lagoon G areas that can be utilized by Holloman-based personnel and the surrounding community.

Currently, the area is being utilized for recreational activities in a limited manner. Bird watching is available in the Lake Holloman area. Waterfowl hunting is permitted in accordance with New Mexico waterfowl hunting regulations in the southern portion of Lake Holloman and the western portion of the constructed wetlands on Saturdays and Sundays between 6:00 a.m. and 10:00 a.m. by both station personnel and members of the surrounding community. Hunters are permitted to use temporary blinds only. Lagoon G and the northern half of Lake Holloman are currently closed to hunting. Primitive camping and hiking are permitted in this area; however, there are no supporting facilities such as developed camp sites or trails available. The 49 FW proposes to develop the existing Lake Holloman and Lagoon G Complex, and in particular, three acres located along the southeast portion of Lake Holloman to enhance its value as a recreation area to Base personnel and the community. The facility would be capable of supporting a squadron event, and approximately 250 to 300 people, within the entire recreation area.

Due to the limited number of recreational opportunities in the surrounding community, development of the Lake Holloman and Lagoon G areas will provide improved access to local recreational opportunities for Air Force personnel and members of the surrounding community. This quality of life initiative will provide integrated recreational opportunities that do not exist elsewhere in the local vicinity. Similar public recreational facilities are located over 70 miles from Holloman AFB. Private lakes are located within 100 miles of Holloman AFB; however, these other recreational opportunities are not under the control of the Air Force, thereby limiting their overall availability to Air Force personnel, especially those with limited transportation options.

## PROPOSED ACTION AND ALTERNATIVES

Holloman AFB proposes to develop a water recreation area at Lake Holloman and the Lagoon G areas to allow the Holloman AFB and Tularosa Basin communities to enjoy water related

activities such as, fishing, picnicking, camping, and boating while maintaining current waterfowl hunting and bird watching activities. The Proposed Action would involve construction of new recreational facilities at Lake Holloman and Lagoon G in addition to allowing new activities such as fishing in Lagoon G and recreational vehicle (RV) use in newly developed areas in the western corner of Lake Holloman

The Proposed Action would divert treated effluent from the base's wastewater treatment facility solely to Lagoon G, as currently allowed under the National Pollutant Discharge Elimination System (NPDES) permit, and develop Lagoon G to support increased recreational activities, such as boating and fishing. The Lake Holloman area would be developed for camping, picnicking, and non-motorized boating, but fishing would be confined to Lagoon G only. Recreational facilities such as a group event pavilion, restroom facilities, primitive and improved camp sites, developed nature trails, a boat rental facility, and additional and/or improvements to boat ramps would be constructed on the southeastern portion of Lake Holloman under the Proposed Action.

Alternative A consists of the same actions as described under the Proposed Action; however, fishing would not be permitted in Lagoon G or Lake Holloman. The construction of new facilities on the southeastern portion of Lake Holloman and RV use in developed areas in the western corner of Lake Holloman would be included, as well as the development of nature trails and the use of non-motorized boating.

The No Action Alternative would continue the current limited use of Lake Holloman and the Lagoon G areas as a recreational area. Boating and fishing would not be permitted. Primitive camping and hiking would be permitted; however, developed camp sites or trails would not be provided. Bird watching and hunting would continue with the current location and time restrictions. The Air Force would continue providing campers/trailers for military personnel to recreate at Elephant Butte, Inn of the Mountain Gods, Caballo Lake, or small private lakes in the Cloudcroft and Ruidoso areas.

This EA analyzes the impacts associated with construction of the Proposed Action, Alternative A, and the No Action Alternative.

## **SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

This EA provides an analysis of the potential environmental consequences during the construction of Proposed Action and the No Action Alternative. Eleven resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0, construction and operation of the recreational area would not result in significant impacts to any resource area.

### ***NOISE***

Aircraft noise may have a minor, negative impact on recreational activities proposed to occur at Lake Holloman and Lagoon G. Boating, picnicking, bird-watching, and fishing activities could potentially be momentarily disrupted by aircraft overflights. Camping, in particular, could be problematic on nights when Holloman AFB is flying late-night missions. Noise impacts on recreational activities resulting from aircraft overflights would be limited to annoyance. All terrain vehicle (ATV) noise may be considered annoying by other users of the Lake Holloman Recreational Area, but noise produced by ATV's would not be expected to preclude any of the other proposed recreational activities. Noise from ATV's may also be disturbing to wildlife,



particularly birds during nesting season. Additional information on off-highway vehicle (OHV) noise impacts on wildlife can be found in Section 4.6, *Biological Resources*.

### ***SAFETY***

Short-term safety risks associated with facility construction could occur, but standard safety practices would minimize any potential risks. In order to assure the safety of the public and Air Force personnel utilizing the Lake Holloman and Lagoon G Complex, emergency communication, and a Visitor Access Control Station should be provided. Additionally, a hunter and fishing educational program should be implemented. ATVs would be permitted in accordance with safety requirements established by the Base Safety office. These requirements may include, but are not limited to, training classes and appropriate protective gear. Also, additional signage should be provided to educate the patrons of potential dangers they may encounter while on-site.

### ***AIR QUALITY***

The Alamogordo area is in air quality attainment for all criteria pollutants. Temporary construction emissions would produce localized short-term elevated air pollutant concentrations. Local air quality or visibility would not be significantly affected. No change is projected to air quality within the Alamogordo area and no conformity determination is required.

### ***EARTH RESOURCES***

The Lake Holloman and Lagoon G Complex is an area typical of the Tularosa Basin and consists of playas and alluvial fans. Therefore, potential impacts to earth resources as a result of the Proposed Action would be minimal. However, the clay soils in the area are extremely slippery during and after rain events. Vehicle incidents and accidents have been experienced due to this condition. Improved road surfaces, gravel, and mulch will aid in improving the situation, but the soil will become more susceptible to erosion with increased foot, ATV, and vehicle traffic and more potentially slick surfaces will result.

### ***PHYSICAL RESOURCES***

Any hazardous waste generated by facilities covered by this EA during everyday or special event operations will be handled by Holloman AFB Solid and Hazardous Waste Managers in accordance with the Holloman AFB Solid and Hazardous Waste Management Plans. No adverse environmental consequences are expected.

Subject to approval by headquarters ACC, garbage and recycling receptacles would be placed at the new facilities for the group pavilion and camping sites. Garbage and recycling would be collected and disposed in accordance with the Holloman AFB Solid Waste Management Plan.

There would be no impacts anticipated to utility infrastructure under the Proposed Action. The recreational facilities that would be constructed would require the installation of minimal utility infrastructure.

### ***BIOLOGICAL RESOURCES***

Impacts to vegetation from construction activities would be expected to be minor due to the small percentage of total vegetative resources in the project area which will be disturbed.

The ground-disturbing activities and the removal of vegetation during construction will expose the soil and make it vulnerable to runoff, especially in areas that have an existing slope. This could potentially affect the water quality of Lake Holloman. Erosion control Best Management Practices (BMPs) such as silt fences, drainage swales, sediment traps, subsurface drains, level spreaders, sediment basins, and infiltration trenches will be implemented throughout the construction period. Techniques for rapid stabilization of disturbed areas include seeding, mulching, geotextiles, sod stabilization, and vegetative buffer strips. Only native species will be used for reseeding. In addition, native trees may be planted within the recreational areas to provide shade.

Noise and human presence from the proposed construction and recreational activities have the most potential to have an effect on five state-listed bird species, especially during nesting season. The western snowy plover, a former federal Category 2 species and currently a federal species of concern has the most potential to be affected. It is commonly observed and has been known to nest within the mudflats, dry salt flats, and playas of the Lake Holloman and Lagoon G Complex, and most commonly within Stinky Playa.

A Cooperative Agreement for protection of the state-listed threatened White Sands pupfish was signed on July 21, 1994 by the Air Force and Army as well as other federal and state agencies. This Cooperative Agreement is formulated to delineate an effective and cooperative working relationship between its signatories in protecting and maintaining viable populations of the White Sands pupfish in its natural habitats on White Sands Missile Range, Holloman AFB, and White Sands National Monument. The Proposed Action would not impact the protective measures and agency responsibilities outlined in this plan.

Effects on other terrestrial wildlife surrounding the project area would be minimal; however, an increase in human activity from the construction and use of the nature trails may dissuade wildlife use of that area. These impacts can be reduced by imposing seasonal restrictions for activities in areas where wildlife nesting or breeding occurs.

### ***WATER QUALITY***

Preliminary analysis of existing water quality data for Lake Holloman suggest that water quality standards for wildlife habitat, aquatic life, and secondary contact are met, however *E.coli* samples suggest that primary contact standards are exceeded. However, since water quality data is still preliminary, and much is incomplete and still awaiting analysis, any decision as to the use of the lake for secondary contact boating and fishing will be determined by the State of New Mexico upon completion of their testing and analysis. Water quality may not be suitable for operation of powered watercraft due to potential for extreme scaling of mechanical parts.

Implementation of construction BMPs during construction will prevent degradation of water quality during the construction phase of the project. Roads and other improvement areas would be sloped away from Lake Holloman and Lagoon G in order to prevent the introduction of petroleum or other harmful substances from entering Lake Holloman or Lagoon G in accordance with the Holloman AFB Stormwater Pollution Prevention Plan (SWPPP).

Impacts to water quality from increased recreational activities would be minimal.

### ***CULTURAL RESOURCES***

None of the properties or options associated with the Proposed Action would affect historic structures on Base. No culturally significant or archeological sites have been identified in the project site.

### ***LAND USE, RECREATION, AND VISUAL RESOURCES***

The development of the water recreation area would have a minor beneficial effect on the current land use at Lake Holloman by expanding the availability of recreational opportunities.

### ***TRANSPORTATION***

Under the Proposed Action, development of recreational activities at Lake Holloman would be expected to result in increases to the number of people visiting the lake. Several of the gravel roads within the project area would be upgraded to provide improved accessibility. Overall, transportation in the Lake Holloman and Lagoon G Complex would improve slightly under the Proposed Action.

### ***INFRASTRUCTURE***

There would be no impacts anticipated to Holloman AFB infrastructure under the Proposed Action. The recreational facilities that would be constructed would require minimal infrastructure to be installed.

### ***SOCIOECONOMICS***

Construction expenditures would have a temporary beneficial effect on the local economy. Additional benefits would be derived from the proposed boat rentals. These boat rentals would be an extension of the boat rentals currently offered by Holloman AFB Services.

### ***ENVIRONMENTAL JUSTICE***

The Proposed Action would provide additional recreational opportunities to minorities and/or low-income populations, as well as children. There would be no populations of concern affected disproportionately by the Proposed Action.

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# **1.0 PURPOSE AND NEED FOR DEVELOPMENT OF LAKE HOLLoman RECREATIONAL AREA**

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Holloman Air Force Base (AFB), located near Alamogordo, New Mexico, is part of Air Combat Command (ACC) and is home of the 49<sup>th</sup> Fighter Wing (49 FW). Holloman AFB also supports German Air Force training and various test programs, including the world's longest rail test track. Currently, the F-22A, T-38, QF-4, and Tornado aircraft operate from Holloman AFB.

In order to provide additional recreational opportunities for Base personnel and the surrounding community, Holloman AFB has proposed to develop recreational facilities within the Lake Holloman and Lagoon G Complex. Currently, the areas around Lake Holloman and Lagoon G do not support organized recreational activities. There are no improved nature trails and boating and fishing are not permitted within the area. The current Air Force Instructions (AFIs), Integrated Natural Resource Management Plan (INRMP), and the installation traffic code prohibit off-highway vehicle (OHV) activity except on the roads and on the installation dirt track. Bird watching and waterfowl hunting are permitted at Lake Holloman only. Hunting is restricted to the southern portion of Lake Holloman. Ponds 1 and 2, Lagoon G, and the northern portion of Lake Holloman are closed to hunting to provide a refuge zone for waterfowl and is designated as a Class III area per AFI 32-7064.

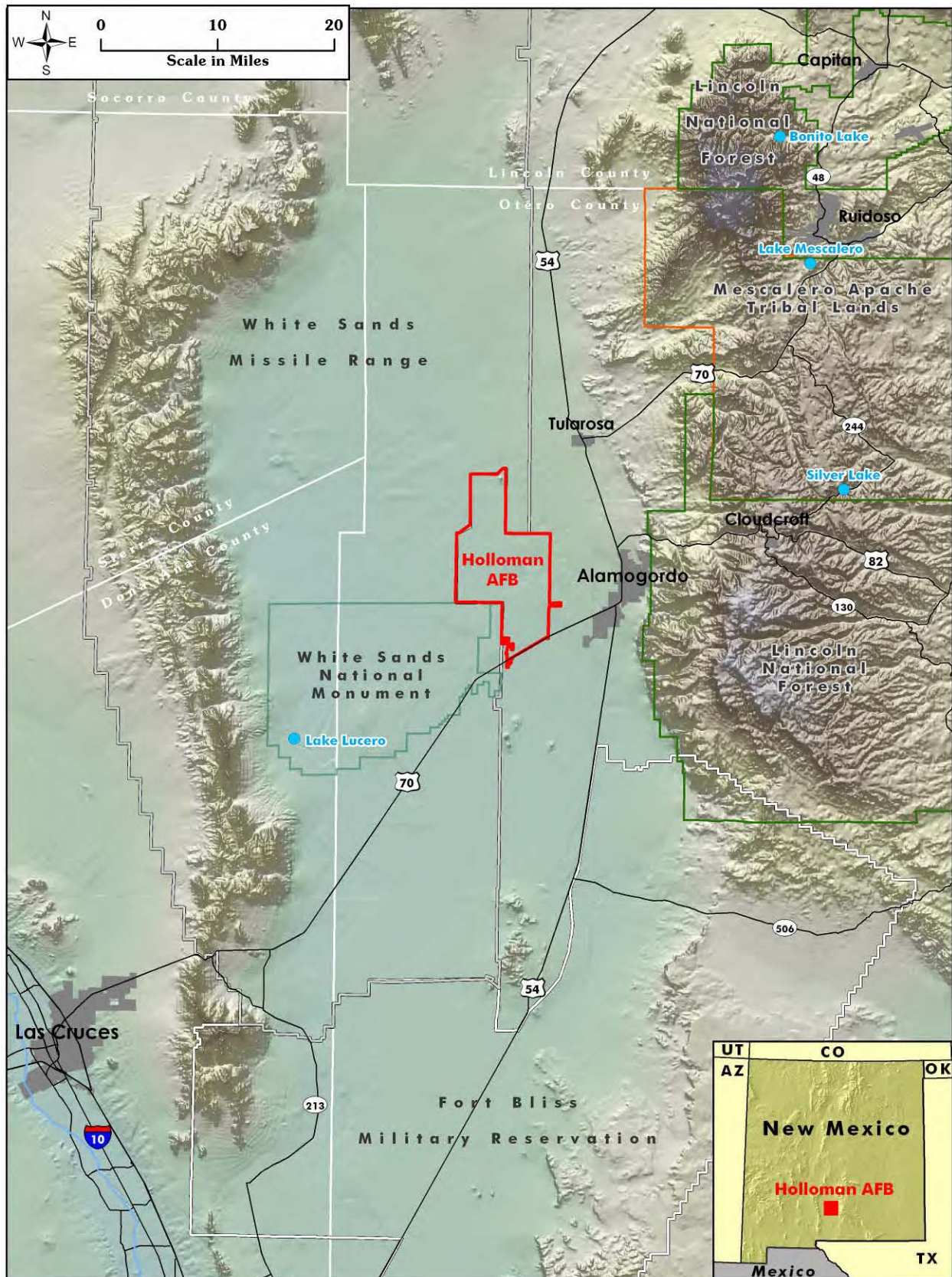
The proposal would involve the construction of camping, picnic areas, nature trails, restrooms and recreational vehicle (RV) facilities, and would allow for additional activities such as boating, fishing, and ATV use, as well as expansion of existing bird watching opportunities.

This Environmental Assessment (EA) will analyze the potential environmental consequences associated with the development of the proposed Lake Holloman Recreational Area and the Lagoon G area according to the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) Regulation of 1978, and 32 Code of Federal Regulations (CFR) Part 989, titled *The Environmental Impact Analysis Process* (EIAP). 32 CFR Part 989 addresses the implementation of NEPA and directs United States Air Force (Air Force) officials to consider the environmental consequences of any proposal as part of the decision-making process.

## **1.1 BACKGROUND**

Holloman AFB covers 59,743 acres of land at an average elevation of 4,093 feet (Figure 1.1-1). Holloman AFB was established in 1942 in the floor of the Tularosa Basin, about 12 miles west of the Sacramento Mountains. Runoff from the mountains is channeled by multiple drainages into natural playas (intermittent lakes) in the basin. The Lake Holloman and Lagoon G Complex is located on the southernmost part of Holloman AFB and comprises approximately 1,700 acres north of United States (U.S.) Highway 70 (Figure 1.1-2). This Lake Holloman and Lagoon G Complex is comprised of Lake Holloman, Stinky Playa, Lagoon G, constructed wetlands, and associated drainage ditches. Lake Holloman and Stinky Playa are remnant alkali playa lakes that were modified in the 1960s through the construction of a non-engineered dam. This dam was created to store domestic stormwater and effluent from Lagoon G and the Holloman AFB Wastewater Treatment Plant (WWTP).

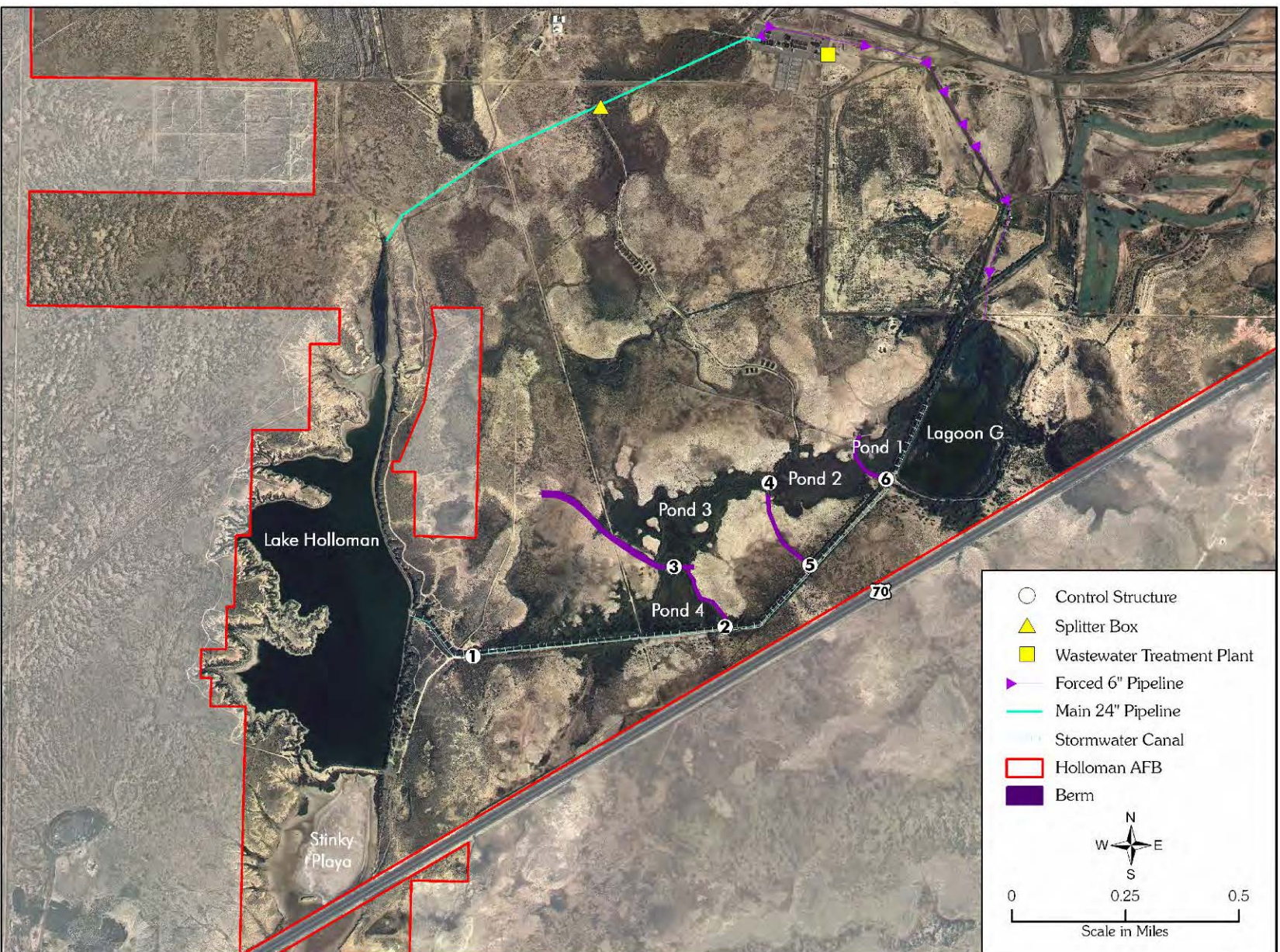




**FIGURE 1.1-1. REGIONAL LOCATION OF HOLLOMAN AIR FORCE BASE, NEW MEXICO**



FIGURE 1.1-2. SITE MAP



A new WWTP was constructed in 1996 with advanced secondary treatment with a system of berms, ditches, and control structures in order to create a complex of constructed wetlands. These constructed wetlands serve as a receiving area for treated sewage effluent as well as a buffer area for stormwater runoff. Currently, effluent from the WWTP is discharged primarily into Lake Holloman with a portion also being discharged in to Lagoon G in order to maintain Lagoon G as a habitat for wildlife and bird species. A storm drainage channel extends between Lagoon G and Lake Holloman, supporting small pockets of wetlands. Stinky Playa is located directly south of Lake Holloman. The playa occasionally contains water as an overflow from Lake Holloman. Figure 1.1-2 illustrates the Lake Holloman and Lagoon G Complex.

## **1.2 PURPOSE OF DEVELOPMENT OF LAKE HOLLOMAN RECREATIONAL AREA**

The purpose of this proposal is to undertake additional development to Lake Holloman and Lagoon G Complex on Holloman AFB. Currently, 255 million gallons per year of WWTP effluent flows to the Lake Holloman and Lagoon G Complex under a multi-party agreement with the Bureau of Land Management (BLM) and the State of New Mexico that allows for public access, now limited to the wetlands, which supports watchable wildlife, migratory birds, and waterfowl hunting. The Proposed Action involves development of a lakeside recreation facility on approximately three acres on the southeastern portion of Lake Holloman and the expansion of recreational activities in the Lake Holloman and Lagoon G area that can be utilized by Holloman-based personnel and the surrounding community.

## **1.3 NEED FOR DEVELOPMENT OF LAKE HOLLOMAN RECREATIONAL AREA**

Currently, the area is being utilized for recreational activities in a limited manner by both station personnel and members of the surrounding community. Bird watching, hiking, primitive camping, and limited waterfowl hunting are permitted in Lake Holloman; however, there are no improvements or facilities available to support these activities. While Lake Holloman is not used for any coordinated recreational activities, there is evidence of ATV use in the Lake Holloman area. Currently boating, fishing, and improved camping are not permitted in either Lagoon G or Lake Holloman.

The 49 FW proposes to develop the existing Lake Holloman and Lagoon G Complex, and in particular, the Lake Holloman area to enhance its value as a recreation area to Base personnel and the community. The facility would be capable of supporting a squadron event, approximately 250 to 300 people, in the newly developed recreation area. Currently, there are limited local opportunities for outdoor recreation in the vicinity of Holloman AFB. Other recreational opportunities within the area require off base travel. For similar recreation activities such as boating and fishing, the only public recreational area is over 70 miles from Holloman AFB. Private lakes and a lake located on Tribal lands are located within 100 miles of Holloman AFB; however, these other recreational opportunities are not under the control of the Air Force, thereby limiting their overall availability to Air Force personnel, especially those with limited transportation options.



## **1.4 SUMMARY OF KEY ENVIRONMENTAL REQUIREMENTS**

### **1.4.1 NATIONAL ENVIRONMENTAL POLICY ACT**

NEPA requires federal agencies to take into consideration the potential environmental consequences of proposed actions in their decision-making process. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. The CEQ was established under NEPA to implement and oversee federal policy in this process. The CEQ subsequently issued the *Regulations for Implementing the Procedural Provisions of the NEPA* (40 CFR Sections 1500–1508) (CEQ 1978).

The activities addressed within this document constitute a federal action and therefore must be assessed in accordance with NEPA. To comply with NEPA, as well as other pertinent environmental requirements, the decision-making process for the Proposed Action includes the development of this EA to evaluate the potential environmental impacts associated with the proposed activities. The Air Force implementing procedures for NEPA are contained in 32 CFR 989 *et seq.*, *Environmental Impact Analysis Process*.

### **1.4.2 ENDANGERED SPECIES ACT**

The Endangered Species Act (ESA) of 1973 (16 United States Code [USC] §§ 1531–1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Federal agencies must evaluate the effects of their proposed actions through a set of defined procedures, which can include the preparation of a Biological Assessment and can require formal consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Act.

### **1.4.3 CLEAN AIR ACT**

The Clean Air Act (CAA) (42 USC §§ 7401–7671, as amended) provided the authority for the United States Environmental Protection Agency (USEPA) to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for seven criteria pollutants: ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), and lead (Pb). The Act also requires that each state prepare a State Implementation Plan (SIP) for maintaining and improving air quality and eliminating violations of the NAAQS. Under the CAA Amendments of 1990, federal agencies are required to determine whether their undertakings are in conformance with the applicable SIP and demonstrate that their actions will not cause or contribute to a new violation of the NAAQS; increase the frequency or severity of any existing violation; or delay timely attainment of any standard, emission reduction, or milestone contained in the SIP.

### **1.4.4 WATER RESOURCES REGULATORY REQUIREMENTS**

The Clean Water Act (CWA) of 1977 (33 USC § 1251 *et seq.*) regulates pollutant discharges that could affect aquatic life forms or human health and safety. Section 404 of the CWA, and Executive Order (EO) 11990, *Protection of Wetlands*, regulate development activities in or near streams or wetlands. Section 404 also regulates development in streams and wetlands and requires a permit from the United States Army Corps of Engineers (USACE) for dredging and

filling in wetlands. EO 11988, *Floodplain Management*, requires federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or within floodplains.

#### **1.4.5 CULTURAL RESOURCES REGULATORY REQUIREMENTS**

The National Historic Preservation Act (NHPA) of 1966 (16 USC § 470) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) outlining procedures for the management of cultural resources on federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties such as ancestral settlements, historic trails, and places where significant historic events occurred. NHPA requires federal agencies to consider potential impacts to cultural resources that are listed, nominated to, or eligible for listing on the NRHP; designated as a National Historic Landmark; or valued by modern Native Americans for maintaining their traditional culture. Section 106 of NHPA requires federal agencies to consult with State Historic Preservation Offices (SHPOs) if their undertakings might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR 800 [1986]) provided an explicit set of procedures for federal agencies to meet their obligations under the NHPA, which includes inventorying of resources and consultation with SHPO.

The American Indian Religious Freedom Act (AIRFA) (42 USC § 1996) established federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC §§ 3001–3013) requires consultation with Native American tribes prior to excavation or removal of human remains and certain objects of cultural importance.

#### **1.4.6 OTHER REGULATORY REQUIREMENTS**

Additional regulatory legislation that potentially applies to the implementation of this proposal includes guidelines promulgated by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to ensure that citizens in either of these categories are not disproportionately affected. Additionally, potential health and safety impacts that could disproportionately affect children are considered under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

#### **1.4.7 ENVIRONMENTAL COORDINATION**

EO 12372, *Intergovernmental Review of Federal Programs*, requires intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), the proponent must notify concerned federal, state, and local agencies and allow them sufficient time to evaluate potential environmental impacts of a Proposed Action. Comments from these agencies are subsequently incorporated into the EIAP (Appendix A).



In its October 1999 annotated *Department of Defense American Indian and Alaska Native Policy*, formulated to address Department of Defense (DoD) responsibilities to tribes derived from a number of federal statutes and policies, DoD has clarified its policy for interacting and working with federally recognized American Indian and Alaska Native governments. Under this policy guidance, proponents must provide timely notice to, and consult with, tribal governments prior to taking any actions that have the potential to affect protected tribal resources, tribal rights, or Indian lands. Tribal input must be solicited early enough in the planning process that it may influence the decision to be made.

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## **2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

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This chapter presents the Proposed Action and alternatives at Holloman AFB associated with the 49 FW development of the Lake Holloman Recreational Area.

### **2.1 PROPOSED ACTION**

The Proposed Action would develop a water recreation area at Lake Holloman that allows the Holloman AFB and Tularosa Basin communities to enjoy water related activities such as picnicking, camping, and boating while maintaining and enhancing current waterfowl hunting and bird watching activities. The Proposed Action would involve construction of new recreational facilities on the southeastern portion of Lake Holloman in addition to allowing new activities such as fishing, RV, ATV, and non-motorized boat use. The facility would be capable of supporting a squadron event, approximately 250 to 300 people, in the entire recreation area. Lagoon G would be developed for fishing, non-motorized boating, and would include new nature trails. Bird watching would be permitted at Lagoon G and the Lake Holloman area. Swimming would not be permitted in either Lake Holloman or Lagoon G due to water quality and safety related concerns.

#### **2.1.1 RECREATIONAL FACILITY CONSTRUCTION AND MANAGEMENT ACTIVITIES**

Approximately \$200,000 in funding has been requested in Fiscal Year (FY) 2009 to initiate development. The new recreational facilities will be developed on the southeastern portion of Lake Holloman, just northwest of the dam (Figures 2.1-1 and 2.1-2). Under this alternative, approximately three acres along the lake would be developed or disturbed for the construction of new recreational facilities. Proper grading of roadways away from water bodies will minimize run-off into Lake Holloman, Lagoon G, or other waterways. Construction would avoid wetlands and would occur only on government-owned land. Construction activities would be scheduled to avoid wildlife breeding seasons to the greatest extent practicable. In addition to construction of recreational facilities, Holloman AFB proposes to change the management activities in the Lake Holloman and Lagoon G Complex. The revised management activities would allow for expanded recreational opportunities by defining the areas and establishing regulations governing these activities. All recreational activities would be operated in accordance with the BLM land transfer agreement which stipulates public access to Lake Holloman be allowed and permits some recreational activities (bird watching and hunting) within the wetlands. Camping would generally follow the guidelines established by BLM for camping on public lands. These include the following guidelines and regulations.

##### ***Guidelines:***

- Pack out what you pack in.
- Avoid camping within 150 feet of any water source.
- Do not leave campfires unattended.
- Dispose of waste properly.

### *Regulations:*

- Travel and camp on durable surfaces (established trails and camps, rock, gravel, or drainages).
- Observe Camping Stay Limit: from April 1 to August 31 it is 7 days, and from September 1 to March 31, it is 14 days. Campers must relocate at least 30 miles and may not return within 30 days to a previous campsite. Camping is for recreational purposes only. Personal property may not be left unattended on public land for longer than 24 hours.
- Fires are permitted only in the metal fire rings and grills in developed campsites. Extinguish your campfire before leaving it unattended. No out of state firewood is allowed.
- Quiet hours are 10:00 p.m. – 6:00 a.m. Please respect other visitors.
- Portable toilets will be used in undeveloped sites for the protection of visitors and water quality.
- Where there is no garbage collection, you must pack out what you bring in. Wastewater holding tanks may not be drained on the ground.
- Accessible sites are reserved for people with disabilities until 6:00 p.m. daily in developed campsites.
- Pets must be on a secure leash no longer than 6 feet or under control of a person.
- Horses and other pack animals are not permitted in developed campgrounds.
- Do not discharge or use firearms, other weapons or fireworks in developed campgrounds.
- Do not deface, remove or destroy plants, soil, rocks or minerals, signs, markers, structures or other property.
- Drive and park only on road.

The facilities proposed for construction and the management activities for Lake Holloman and Lagoon G are as described as follows:

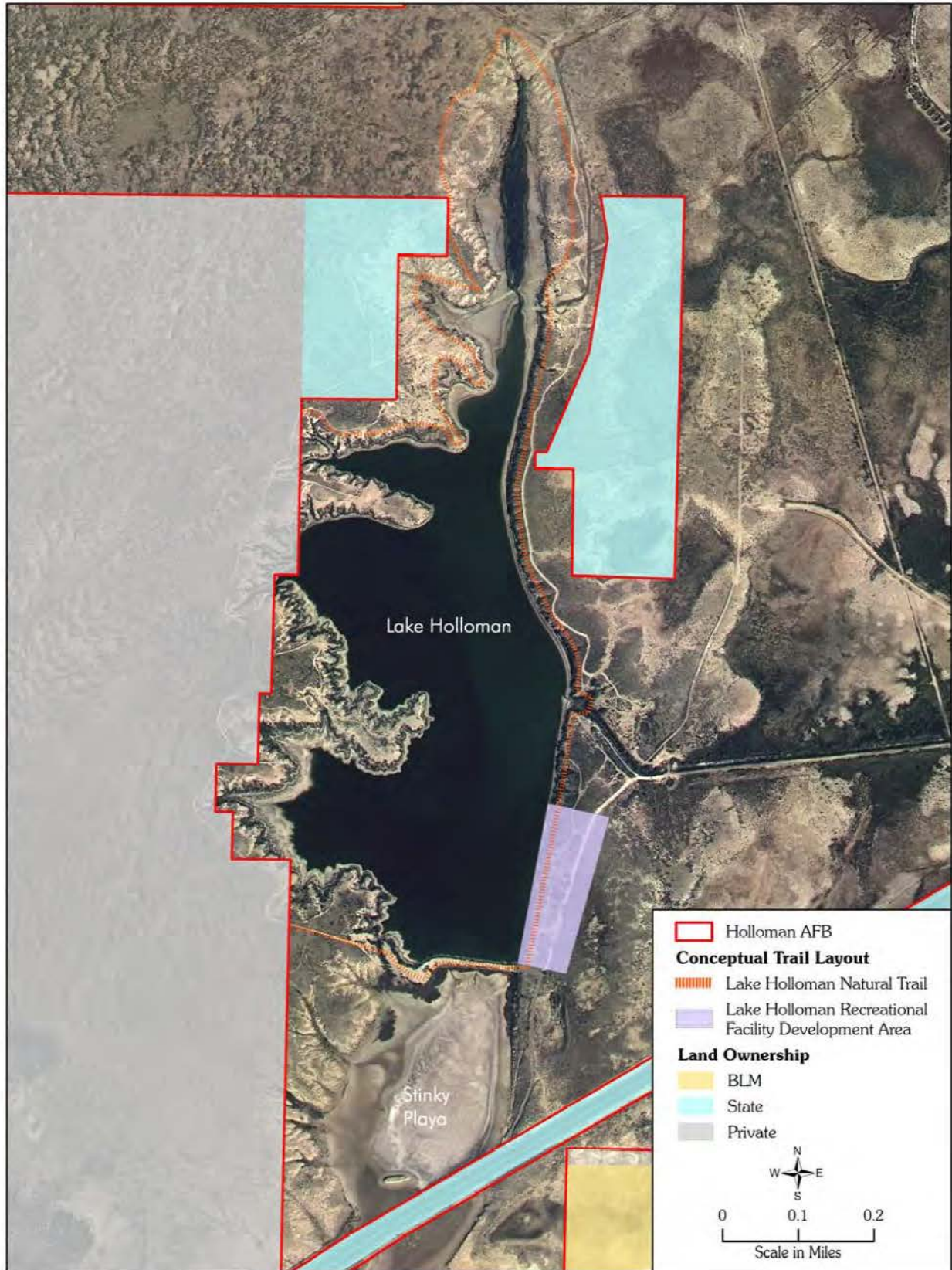
### *Lake Holloman Proposed Recreational Facilities and Management Activities*

1. Group Event Pavilion (3,600 square feet [SF]) – Intended for Squadron Picnics, Family Reunions, etc.
  - a. 50 feet x 50 feet – steel construction, paneled roof, rock fireplace/grill on one end.
  - b. Adjacent to one set of restrooms and relatively close to camp sites.
  - c. Power required – 110v to support music, crock pots, etc.
  - d. Security lighting.
  - e. Potable water.



**FIGURE 2.1-1. LAKE HOLLOMAN RECREATIONAL FACILITY CONSTRUCTION**





**FIGURE 2.1-2. LAKE HOLLOMAN RECREATIONAL FACILITY NATURE TRAILS**



2. Boat Rental Facility (1,500 SF) – Intended to store/issue rental paddle boats/sail boats.
  - a. 20 feet x 40 feet – pre-engineered metal building.
  - b. Adjacent to boat ramp.
  - c. Power required – 110v to support cash register, refrigerator, and window air conditioner.
3. Restroom Facilities (680 SF) – Intended to support primitive camping and large gatherings.
  - a. 2 units, each 12 feet x 15 feet.
  - b. Double-vaulted, pre-manufactured (Pre-Cast) with holding tank(s).
  - c. 1 adjacent to camping, 1 adjacent to group pavilion.
  - d. No utilities required (sewage pumped from holding tank).
4. Primitive Camping (8,000 SF) – Intended to provide level pad, grill and fire ring, with picnic table only.
  - a. 10 - 800 SF sites, located north of all other activities.
  - b. Sites will be leveled with crushed aggregate/asphalt. Additional sand or soil may be added to some sites to allow for tent camping.
  - c. Work accomplished by volunteers, materials delivered from re-use area.
  - d. Each site will include a fire ring, barbeque grill, and a picnic table with shelter.
5. Improved Camping (150,000 SF) – Intended to provide overnight RV facilities.
  - a. 10 sites, located east of Primitive Camping sites.
  - b. Electricity and potable water provided.
  - c. Single sewage dump tank located on site.
6. Nature Trails (48,000 SF) – Intended to provide walking trails for education and enjoyment of the surrounding area.
  - a. Approximately 16,000 linear feet (3 miles) of nature trails no wider than 3 feet.
  - b. Proper grading away from water bodies will minimize run-off into Lake Holloman, Lagoon G, or other waterways.
  - c. Trails will be located on government-owned property only around Lake Holloman. Culverts/bridges would be installed where necessary. The west side of Lake Holloman is private land and nature trails would not be developed on private land.
  - d. Educational kiosks/interpretative signs may be placed along the trail.
  - e. Trails will not be developed in wetland areas and would be restricted to foot traffic only.
7. Regrade existing boat ramp.
8. Grade existing roads and improve parking areas using locally available crushed concrete. Proper grading of roadways away from water bodies will minimize run-off into Lake Holloman, Lagoon G, or other waterways.
9. Plant sustainable native trees around recreational area to improve aesthetics and provide shade.
10. The rental and use of non-motorized boats in Lake Holloman, to include paddle boats, sail boats, and canoes.

11. Allow for ATV riding on designated roads on government-owned property in accordance with AFI 32-7064 and Holloman AFB INRMP. ATV use would be restricted to existing roads and in areas that can sustain their use without damage to natural or cultural resources. ATV use would not be permitted in wetlands or sensitive areas, including wildlife areas. Signs would be posted to notify ATV riders of these restricted areas. Prior to the allowance of ATV use in the Lake Holloman or Lagoon G area, Holloman AFB Natural Resources personnel would thoroughly evaluate each resource base, particularly soils and wildlife. Other restrictions to ATV use from this assessment by Holloman AFB Natural Resources personnel would be incorporated into an updated INRMP.
12. Open or remove locked gates to allow public access between Lake Holloman and Lagoon G.
13. Develop improved camp sites for tent camping.
14. Change signage in the area to identify additional public access areas including designated roads for ATV use, nature trails on government-owned land, and watchable wildlife areas.

Table 2.1-1 shows estimates of the sizes of the proposed facilities which will be constructed as part of the proposal.

**TABLE 2.1-1. FOOTPRINTS OF PROPOSED RECREATIONAL FACILITIES**

<i>Facility</i>	<i>Area (SF)</i>
Group Event Pavilion	3,600
Boat Rental Facility	1,500
Restroom Facilities (2)	680
Primitive Camping Area	8,000
Improved Camping Area	15,000
Nature Trails	48,000
<b>TOTAL</b>	<b>76,780</b>

***LAGOON G PROPOSED RECREATIONAL FACILITIES AND MANAGEMENT ACTIVITIES***

Treated effluent from the Holloman AFB WWTP would be diverted solely to Lagoon G, as currently allowed under the National Pollutant Discharge Elimination System (NPDES) permit, to support increased recreational facilities such as fishing. Swimming would not be permitted in Lagoon G. Fishing in Lagoon G would be permitted. There would be no introduction of non-native fish species. Live bait would not be allowed. Any introductions of other native fish species would be evaluated through consultation with New Mexico Department of Game and Fish and their Conservation Services Division.

1. Nature trails would be restricted to foot traffic only and would not be developed in wetlands or sensitive areas. ATV use would not be permitted around Lagoon G. Educational kiosks/interpretive signs may be added along the nature trails and signs would designate the watchable wildlife areas.
2. Only non-motorized boats would be permitted. An existing boat ramp is available at Lagoon G, but may be modified (reggraded). Prior to launching, private boats would be

inspected for the presence of foreign exotic organisms (pest species) that may impact the aquatic ecosystem.

3. Upgrades to perimeter fence between Lagoon G and the main base to restrict access, as required for base security, to the flightline, housing, golf course, running track, and gym. Based upon the extent of these security upgrades, a separate EA may be required for those actions.

## **2.2 ALTERNATIVE A**

Alternative A would develop and manage the Lake Holloman and Lagoon G Complex for camping, picnicking, and ATV use as described in Section 2.1.1. Nature trails would be developed at Lake Holloman and Lagoon G. Fishing would not be permitted in Lagoon G or Lake Holloman. Bird watching would be permitted at Lagoon G, but would be closed to hunting.

## **2.3 NO ACTION ALTERNATIVE**

No Action for this EA means the current use of Lake Holloman as a limited recreational area with the Air Force providing campers/trailers for military personnel to recreate at Elephant Butte, Inn of the Mountain Gods, Caballo Lake, or small private lakes in the Cloudcroft and Ruidoso areas. Recreational activities will continue to be available at Lake Holloman and the surrounding enhanced playa wetlands habitat for bird watching and seasonal hunting.

## **2.4 IDENTIFICATION OF ALTERNATIVES**

### **2.4.1 IDENTIFICATION OF REASONABLE ALTERNATIVES**

The following criteria were used to determine if there were reasonable alternatives that would allow for water-centric recreational opportunities for Holloman AFB personnel and members of the surrounding community.

1. Use of existing water-centric recreational opportunities in the vicinity of Holloman AFB.
2. Development of other location within Holloman AFB.
3. Consistent with Air Force policy, utilization of facilities under the control of or under use agreements with the Air Force which would provide military personnel with easier access to a local recreational area and facilities.

### **2.4.2 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD**

#### **2.4.2.1 USE OF EXISTING WATER-CENTRIC RECREATIONAL OPPORTUNITIES IN THE VICINITY OF HOLLoman AFB**

Other water related recreational activities are available within a 100-mile radius of Holloman AFB; these are listed below.

Lake Bonito, covering approximately 50 acres, is 72.5 miles northeast of Holloman AFB. The trip takes 1 hour, 50 minutes. Fishing, hiking, and camping areas are open to the public. Holloman AFB has no active part in the management of the recreational activities currently managed solely by the City of Alamogordo.

Hideaway Lake is a privately owned lake 58.6 miles from Holloman AFB and located in Ruidoso, New Mexico, north of Holloman AFB. No agreement or contract is known to exist for military personnel to utilize this facility.

Lake Mescalero, approximately 200 acres at the Inn of the Mountain Gods Resort, is 52.2 miles north of Holloman AFB on Tribal land outside of Ruidoso, New Mexico. It offers fishing, boating, camping, hunting, and other recreational opportunities. There is currently no formal agreement between the Native American Tribe and the Air Force to use these facilities.

Silver Lake (private), approximately 15 acres in size, is located approximately 35 miles from Holloman AFB. Camping and fishing are available to guests. No agreement or contract is known to exist for military personnel.

Lake Lucero is located west southwest of Holloman AFB in the White Sands National Monument. It is a playa lake that normally has some water. The lake has been as small as a few very shallow acres to as large as several thousand extending to Stallion Range. The lake is not open to public use; no camping, fishing, boating, or swimming is permitted.

#### ***2.4.2.2 BOLES WELL RESERVOIR ALTERNATIVE***

This alternative would have included the construction of an artificial lake outside of the Holloman AFB main base. The Boles Well Water System Annex currently consists of groundwater wells that supply Holloman AFB with all of the Base's potable water. The development of Boles Well Reservoir would require construction of a 10 million gallon artificial lake/reservoir. Water for the reservoir would be supplied by the groundwater wells from the Boles Well Water System. Construction of the reservoir would include part dig, part berm to a depth of 10 feet, installation of an impervious lining and construction of a beach area. A swimming area would be constructed to have a slope from 1 to 5 feet. Water levels in the Boles Well Reservoir would be maintained from the groundwater wells at a rate to adequately supply Holloman AFB with potable water and support its recreational use.

The facility would be 7 to 12 miles from the main gate. Travel time would be approximately 20 minutes from Base housing to destination and 10 to 20 minutes from Base personnel residing in Alamogordo. Construction of the reservoir would require a siting study, extensive excavation, environmental and construction evaluations/studies, regulatory permitting, substantial operations and maintenance funding, and disturbance of potential cultural and archaeological sites.

#### ***2.4.2.3 DEVELOPMENT OF OTHER AREAS WITHIN HOLLOMAN AFB***

Other areas within Holloman AFB, such as existing borrow pits, pools, and playas, would require extensive construction with resultant environmental and potential operational impacts (such as unacceptable risks to flight safety from bird-aircraft strikes and incursions into safety and/or security zones).

#### ***2.4.2.4 DEVELOPMENT OF OTHER ACTIVITIES AT LAKE HOLLOMAN AND LAGOON G COMPLEX***

Several other activities were considered for development with the Lake Holloman and Lagoon G Complex including a beach area, conventional boat ramp, and a paddle boat launch area at Lake Holloman, as well as stocking Lagoon G with hybrid striped bass and permitting dove and quail hunting within Lagoon G and constructed wetlands. These projects were removed from the proposed projects in response to comments received by the public and regulatory

agencies expressing concerns that these activities would interfere with native species and presented safety issues for other recreation users. Swimming, motorized boating, and fishing was also considered in Lake Holloman; however, it was determined that the water quality in Lake Holloman would not be able to support these activities or allow for any primary contact water-related activities.

### **2.4.3 RESOURCES ELIMINATED FROM DETAILED CONSIDERATION**

Airspace management and air traffic control were not evaluated in this EA because it was determined that implementation of the Proposed Action or alternatives are unlikely to affect these resources.

### **2.4.4 COMPARISON OF ALTERNATIVES**

Table 2.4-1 summarizes the potential environmental impacts of the Proposed Action, Alternative A, and the No Action alternative, based on the impact analyses presented in Chapter 4.0. In no resource category would the environmental consequences be significant with the implementation of the Proposed Action.

**TABLE 2.4-1. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS**

<i>Resource</i>	<i>Proposed Action</i>	<i>Alternative A</i>	<i>No Action Alternative</i>
Noise	-	-	0
Safety	+	+	0
Air Quality	0	0	0
Earth Resources	-	-	0
Physical Resources	0	0	0
Biological Resources	-	-	0
Water Quality	0	0	0
Cultural Resources	0	0	0
Land Use, Recreation, and Visual Resources	+	+	0
Transportation	+	+	0
Infrastructure	+	+	0
Socioeconomics	+	+	0
Environmental Justice	0	0	0

- = Adverse but no significant impact

+ = Positive/Beneficial Impact

0 = No Change

## **2.5 PERMIT REQUIREMENTS**

This EA has been prepared in compliance with NEPA, other federal statutes, and applicable state statutes and regulations. A list of Holloman AFB permits was compiled and reviewed during the EA process. Table 2.5-1 summarizes these applicable federal, state, and local permits and the potential for change to the permits due to the Proposed Action. Management actions and procedures would need to be reviewed, coordinated and/or updated to ensure Air Force compliance with applicable instructions, guidance, and directives. No new permits are expected to be required; however, review of existing permits is conducted as part of the environmental review process for each new project.

**TABLE 2.5-1. ENVIRONMENTAL RELATED PERMITS**

<i>Permit</i>	<i>Resource</i>	<i>Proposed Action</i>
Air Quality Operating Permit	Air	No change to existing permit expected.
Holloman AFB National Pollutant Discharge Elimination System (NPDES)	Point Discharge	Proposed on-base projects would need to comply with existing permit terms. A change to the permit may be required to address additional stormwater outfall areas.
Holloman AFB Stormwater Pollution Prevention Plan (SWPPP)	Stormwater	All operators of construction site activities that result in a land disturbance of equal to or greater than one acre must apply for the general permit by submitting a Notice of Intent to U.S. Environmental Protection Agency (USEPA) that includes a SWPPP and erosion and sediment control plan that include site specific best management practices (BMPs) and measurable goals for implementation and maintenance.
Holloman AFB Hazardous Waste	Hazardous Waste	No change to existing permit expected.
U.S. Army Corps of Engineers (USACE) Wetlands Permits New Mexico Environment Department (NMED) Surface Water Quality Bureau Permits	Water	Joint application to obtain permit from USACE and water quality certification from NMED/Surface Water Quality Bureau. Application required to excavate or fill wetlands or waters of the U.S. Approval and possible mitigations would be defined in the approval.



## **3.0 AFFECTED ENVIRONMENT**

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This chapter describes the affected environment at Holloman AFB and the potentially affected region. Based on the characteristics of the Proposed Action (Chapter 2.0), it was determined that the following resources could possibly be affected: noise; safety; air quality; earth resources; physical resources; biological resources; water resources; cultural resources; land use, recreation, and visual resources; transportation; infrastructure; socioeconomics; and environmental justice. The existing environmental conditions within the expected geographic extent of potential impacts, known as the region of influence (ROI), are addressed for each environmental resource in this chapter.

### **3.1 NOISE**

#### **3.1.1 DEFINITION OF THE RESOURCE**

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. Stationary sources are normally related to specific land uses, e.g., housing tracts or industrial plants. Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports), or randomly. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal).

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air or water, and are sensed by the ear drum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed "A-weighted," and are shown in terms of A-weighted decibels (dBA).

As a basis for comparison when noise levels are considered, it is useful to note that at distances of about 3 feet, noise from normal human speech ranges from 63 to 65 dB, operating kitchen appliances range from about 83 to 88 dB, and rock bands approach 110 dB.

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. The word “metric” is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics that take into account characteristics of noise. Each metric was developed by researchers attempting to represent or predict the effects of environmental noise.

The maximum sound level ( $L_{\max}$ ) metric defines peak noise levels.  $L_{\max}$  is the highest sound level measured during a single noise event (e.g., an aircraft overflight). For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level as the aircraft recedes into the distance.  $L_{\max}$  is important in judging a noise event’s interference with conversation, sleep, or other common activities.

The number of times noise events occur during given periods is also an important consideration in assessing noise impacts. The Day-Night Average Sound Level (DNL) metric sums the individual noise events and averages the resulting level over a 24-hour period. The metric adds 10 dB to those events that occur between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the day time. Thus, it is a composite metric that considers the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. Scientific studies and social surveys have found the DNL to be the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and several governmental agencies including the Department of Housing and Urban Development, the U.S. Department of Transportation, the Federal Aviation Administration, the USEPA, and the Veteran’s Administration (USEPA 1974; Federal Interagency Committee on Noise 1992). Using measured sound levels as a basis, the Air Force developed the Noisemap computer program to calculate DNL noise levels resulting from aircraft operations in the vicinity of an air installation.

In 1980, the Federal Interagency Committee on Urban Noise published a set of land use recommendations for varying aircraft noise levels, as measured in DNL. Each land use is designated as being compatible or incompatible with a stated range of noise levels. These recommendations were adopted, with only minor alternations, by the Air Force and several other government agencies. The Air Force regularly publishes Air Installation Compatible Use Zone (AICUZ) Reports, which include land use recommendations and maps showing areas of elevated aircraft noise (Air Force 1999). The intent of the AICUZ program is to facilitate wise long-term community planning and regulation of land use. AICUZ recommendations are considered as part of the facility planning/siting/design process on Holloman AFB and in surrounding Otero County.

The ROI for noise impacts consists of the Lake Holloman and Lagoon G Complex, and the areas immediately surrounding these features.

### **3.1.2 EXISTING CONDITIONS**

Noise levels in the ROI are low most of the time, and during these times, the noise environment is characterized by natural sounds (e.g., birds, insects, wind) and the sounds of traffic on nearby

Highway 70. However, the project areas are located 1 to 2 miles from Holloman AFB runways, and frequently overflown by military aircraft arriving to or departing from Holloman AFB. The 49 FW is currently transitioning from previously flying F-117 aircraft to the current F-22A aircraft (Air Force 2006). Maximum noise levels associated with overflights by aircraft that will be common at Holloman AFB, once the beddown action of the F-22A is complete, are shown in Table 3.1-1.

**TABLE 3.1-1. REPRESENTATIVE MAXIMUM SOUND LEVELS FOR DIRECT OVERFLIGHTS BY SELECT AIRCRAFT TYPES<sup>1</sup>**

<i>Aircraft</i>	<i>Power</i>	LMAX, dB AT VARIOUS HEIGHTS AGL, FEET			
		<i>500</i>	<i>1,000</i>	<i>2,000</i>	<i>3,000</i>
T-38	90% RPM	88.3	81.1	73.1	60.7
F-22A	70% ETR	115.3	107.8	99.1	84.9
Tornado	89% RPM	99.0	91.7	83.8	71.9

Note: 1. Airspeed 400 knots, temperature 59 degrees Fahrenheit (°F), 70 percent relative humidity.  
AGL = above ground level; RPM = revolutions per minute; ETR = engine thrust request

Lake Holloman and the area immediately surrounding it are exposed to aircraft noise ranging from less than 65 dB DNL to approximately 79 dB DNL. Lagoon G is exposed to aircraft noise between 75 and 79 dB DNL (Air Force 2006). The ROI is currently open space, used very occasionally for limited camping, hunting, and bird watching. Visitors to the area generate intermittent noise (e.g., voice, music, vehicles, gunfire associated with hunting) which may temporarily disturb wildlife, such as nesting birds. With the exception of migratory birds, wildlife living in the ROI can be assumed to have habituated to aircraft noise, if not noise level associated with the F-22A aircraft.

## **3.2 SAFETY**

### **3.2.1 DEFINITION OF THE RESOURCE**

Safety encompasses the many issues that directly affect the protection of human life and property. The safety issues relevant to this Proposed Action at Holloman AFB are ground safety, flight safety, and explosive safety.

### **3.2.2 EXISTING CONDITIONS**

Ground and flight safety involving aviation operations as potentially impacted by the proposed actions which are conducted by the 49 FW are addressed in this section. Because of the proposal to construct within portions of the airfield environment, the focus of this section is on safety-of-flight issues associated with airfield operations. Issues involving operations and maintenance activities that support operation of the airfield are addressed. Also considered in this section is the safety of personnel and facilities on the ground that may be placed at risk from flight operations.

The ROI for safety in this EA includes the airfield at Holloman AFB and its immediate vicinity including the Lake Holloman and Lagoon G Complex project area.

### **GROUND SAFETY AND FORCE PROTECTION**

Ground safety includes safety as it pertains to construction and demolition, airfield operations, and potential accident zones, as well as force protection.

The Air Force has conducted several studies over many years assessing aircraft accidents occurring in the vicinity of airfields. The studies show that approximately 27 percent of the accidents occurred on, or within an area 1,000 feet on either side of the runway; approximately 29 percent occurred within 3,000 feet from the end of the runway and 1,500 feet on either side of the extended runway centerline. Extending the 3,000-foot wide region another 5,000 feet accounted for an additional 18 percent of the accidents, and further extending it 7,000 feet accounted for an additional 5 percent (Air Force 2005a).

Clear Zones and Accident Potential Zones are surface areas, described geographically on the ground. Specific dimensions, geophysical and topographic standards, and approved land uses are discussed in detail in Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*; AFI 32-7063; and Air Force Handbook 32-7084. The Clear Zone is basically a square that is 3,000 feet long and 3,000 feet wide at both ends of the runway (extends 3,000 feet out from the end of the runway and 1,500 feet on either side of the runway centerline). It is 206 acres in size at each end of the runway and includes the 46 acres of the Graded Area. UFC 3-260-01 dictates that within the Clear Zone (and outside of the Graded Area), there can be no permanent facilities. Brush and trees are allowed in this area; however, they may not penetrate the approach/departure slope, or the Transitional Surface slope.

The Graded Area is an area within the Clear Zone that is 1,000 feet in length and 2,000 feet wide (extends 1,000 feet from the end of the runway and 1,000 feet on either side of the runway centerline). The Graded Area is 46 acres at each end of the runway. UFC 3-260-01 dictates that the Graded Area must be clear of all aboveground obstacles (including roadbeds) and vegetation (except grass [herbaceous]). It must also have no abrupt surface irregularities, such as ditches or ponds. The maximum allowable slope of the Graded Area is +/- 2 percent.

Force protection is a security program designed to protect Air Force personnel, civilian employees, family members, facilities, and equipment, in all locations and situations. The program is accomplished through the planned and integrated application of anti-terrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks and the need to improve force protection, the DoD in the late 1990s required the development of Anti-Terrorism/Force Protection (AT/FP) guidelines for new construction. That requirement is implemented with AT/FP Construction Standards contained in AFI 31-210 to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of facilities. These standards are integrated at Holloman AFB into the new construction and major renovation projects to which they apply.

Force protection at Holloman AFB also is maintained through the use of the entry gates to control access to the Base. Vehicles enter and exit the Base through three gates. These gates provide access to the Base from Highway 70. The Main Gate is located approximately 6 miles west of U.S. 54. The West Gate, which is located approximately 1 mile west of the Main Gate along U.S. 70, serves all commercial traffic as well providing an alternative access to the Base from U.S. 70 for non-commercial traffic. The La Luz gate is located on a northeast corner of the Base and provides service for Base personnel who live in the area north of Alamogordo.

Holloman AFB fire management is operated in accordance with applicable DoD, Air Force, federal and state laws, regulations, and policies. The *Holloman AFB Wildland and Prescribed Fire Management Plan* provides guidance for daily and long-term management of wildland fire. Holloman AFB 49 CES/CEF Fire Department has Joint Powers Agreements with the State of

New Mexico Energy, Mineral, and Natural Resources Department (EMNRD) and the Federal Departments of Agriculture (U.S. Forest Service), Energy (Los Alamos Area Office), and Interior (Bureau of Indian Affairs, BLM, National Park Service, and USFWS). In addition, they have Mutual Aid Agreements with Otero County and Alamogordo fire departments. Holloman AFB has responsibilities for initial response within the Lake Holloman Wetland Complex (Air Force 2007).

Holloman AFB Fire Department personnel, augmented by local fire and rescue personnel, respond to mishaps and accidents on Holloman AFB and vicinity per the above referenced agreements.

Hunting is currently permitted in designated areas of Lake Holloman. Hunting is permitted only on Saturdays and Sundays between 6:00 a.m. and 10:00 a.m. as outlined in the Holloman AFB INRMP. Certain duck species are regulated through seasonal closures set by federal regulations. Hunters are required to check in at the Holloman AFB Visitors' Center and must have a valid New Mexico State hunting license with a permit number for the mandatory Federal Migratory Bird Hunting and Conservation Stamp, proof of completion of an approved hunter education course, and a Holloman AFB permit for a specific designated hunt location for each day's hunt. Hunters are required to stay within five yards of their designated hunt location while shooting. All discharged shotgun shells and litter are the responsibility of the hunter. Holloman AFB reserves the right to close the area to hunting whenever security is a concern or law enforcement support is unavailable.

### **3.3 AIR QUALITY**

#### **3.3.1 DEFINITION OF THE RESOURCE**

This section discusses air quality considerations and conditions at Holloman AFB in Otero County, New Mexico. The approach to the air quality analysis was to estimate any increase in emission levels due to the proposed Lake Holloman Recreational Area Development.

#### **3.3.2 EXISTING CONDITIONS**

**Attainment Status.** The USEPA designates all areas of the U.S. as having air quality better than or equal to (attainment) or worse than (nonattainment) the NAAQS. The criteria for nonattainment designation varies by pollutant: (1) an area is in nonattainment for O<sub>3</sub> if the three-year average of the fourth-highest daily maximum eight-hour average O<sub>3</sub> concentrations measured at each monitor within an area over each year exceeds 0.075 parts per million (ppm) (40 CFR 50 and 58) and (2) an area is generally in nonattainment for any other pollutant if its NAAQS has been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas.

A review of the federally published attainment status for Otero County, New Mexico, in 40 CFR 81.322 indicated that this region is designated as attainment (i.e., meeting national standards) for all criteria pollutants, including CO, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, O<sub>3</sub>, and Pb.

**Class I Areas.** Mandatory Prevention of Significant Deterioration (PSD) Class I areas established under the CAA Amendments of 1977 for New Mexico are listed under 40 CFR 81.421. The nearest PSD Class I area is the White Mountain Wilderness Area, located approximately 43 miles northeast of Holloman AFB. Other Class I areas within approximately 180 miles of Holloman AFB include Bosque del Apache National Wilderness Refuge,

Guadalupe Mountains National Park, Carlsbad Caverns National Park, and the Salt Creek and Gila wilderness areas (Figure 3.3-1).

**Regional Air Emissions.** The NEPA process must consider impacts from mobile sources and indirect emissions related to the project, some of which occur outside of the installation. For comparison purposes, Table 3.3-1 lists county-wide emissions for Otero County as compiled by USEPA in its National Emissions Inventory (NEI). This table uses the inventory data for 2002. The 2002 NEI contains estimates of annual emissions for stationary and mobile sources of air pollutants in each country on an annual basis.

**TABLE 3.3-1. AIR EMISSIONS INVENTORY OTERO COUNTY, NEW MEXICO**

<i>Source Type</i>	OTERO EMISSIONS (TONS/YEAR)				
	<i>CO</i>	<i>NO<sub>x</sub></i>	<i>PM<sub>10</sub></i>	<i>SO<sub>x</sub></i>	<i>VOC</i>
Area Sources	891	148	57,842	52	928
Non-Road Mobile	2,396	628	28,913	42	287
On-Road Mobile	13,632	1,511	28,952	52	1,076
Point Sources	25	20	69	0	0
Total	16,944	2,308	115,776	146	2,291

CO = carbon monoxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> = particulate matter; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

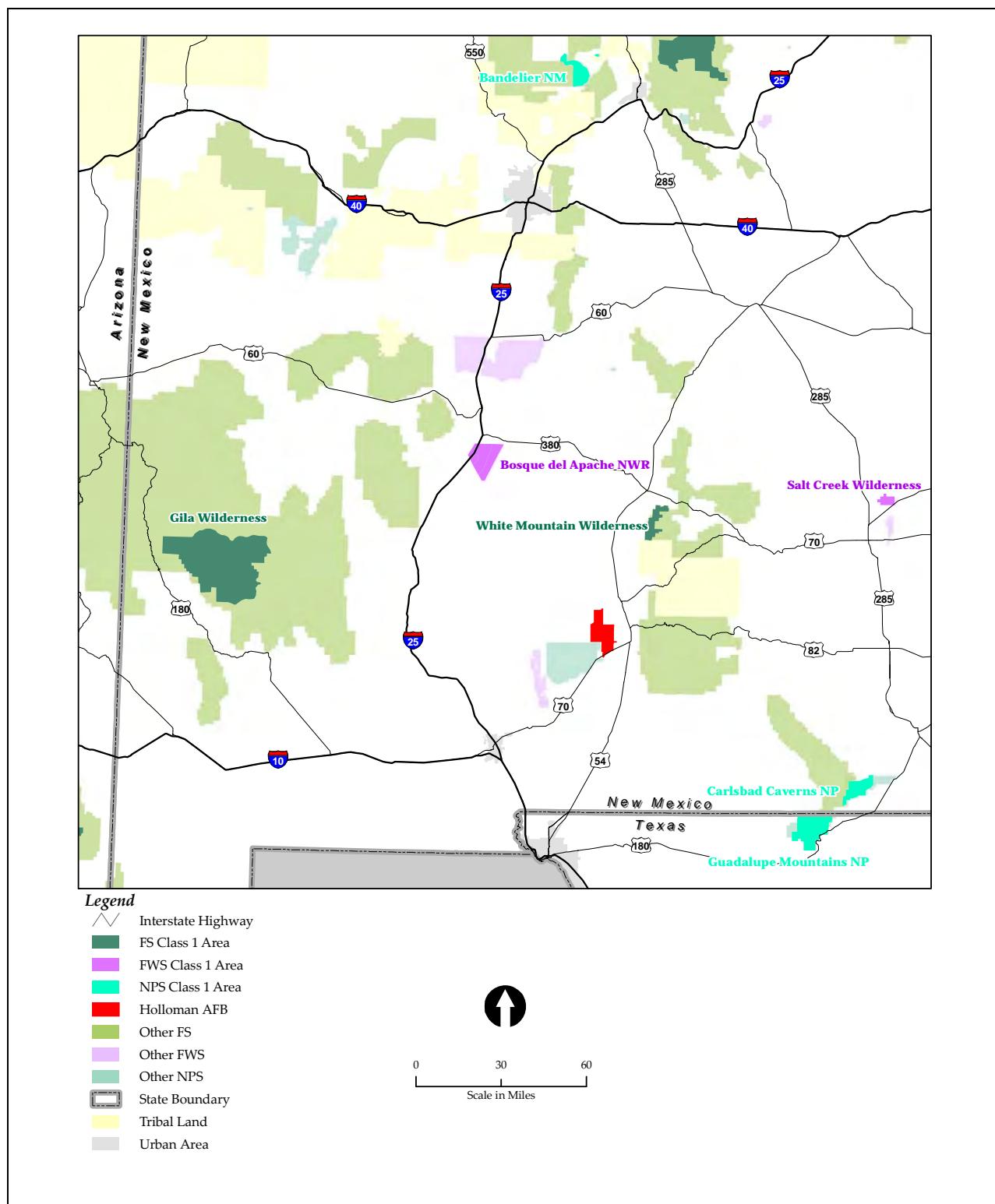
Source: USEPA 2002

## **3.4 EARTH RESOURCES**

### **3.4.1 DEFINITION OF THE RESOURCE**

Earth resources include geology, soils, and topography. Geologic resources of an area typically consist of surface and subsurface materials and their inherent properties. The term “soils” refers to unconsolidated materials formed from the underlying bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil drainage, texture, strength, shrink-swell-potential, and erodibility all determine the suitability of the ground to support man-made structures and facilities.

The ROI for earth resources considered in this EA includes the Lake Holloman and Lagoon G Complex and Holloman AFB. The geologic description for the project site is general to the region surrounding Holloman AFB including the project area, while the soils discussion is site specific.



Source: Holloman AFB n.d.a

**FIGURE 3.3-1. PREVENTION OF SIGNIFICANT DETERIORATION CLASS I AREAS  
NEAR HOLLOMAN AFB, NEW MEXICO**

### **3.4.2 EXISTING CONDITIONS**

#### **3.4.2.1 GEOLOGY**

Holloman AFB is located in the Tularosa Basin, a downfaulted, closed, intermountain basin located in the southern portion of the Rio Grande Rift. The Tularosa Basin is thought to have formed approximately 35 million years ago as a result of faulting, with the most recent formational activity having occurred as recently as 10,000 years ago (Huff 2004). Basin fill of the Tularosa Basin is derived from the erosion of the uplifted material and fluvial deposits from the Rio Grande River, and consists of unconsolidated coarse- to fine-grained alluvial fan deposits along the rims of the basin and are gradational toward the basin into finer grained alluvial, fluvial, and lacustrine deposits. Evaporite materials, such as selenite, are not uncommon (Huff 2004). Prominent local physiographic features include the Sacramento Mountains to the east, San Andres Mountains, and White Sands National Monument to the west.

#### **3.4.2.2 SOILS**

Soils information for this section is derived from the Natural Resources Conservation Service (NRCS) Soil Survey spatial and tabular database for parts of Otero, Eddy, and Chaves Counties. According to the NRCS, Holloman AFB falls within the Major Land Resource Area (MLRA) classification of Southern Desertic Basins, Plains, and Mountains. Dominant soil orders in this MLRA are Aridisols, Entisols, Mollisols, and Vertisols (U.S. Department of Agriculture [USDA] 2006). A soil order is the highest organizational level in the soils classification system and soils are grouped according to the degree of their horizon development and the kinds of horizons present. The soils in this MLRA tend to be moderately deep to very deep, well-drained, and loamy or clayey with a typically thermic soil temperature regime (mean annual soil temperature is 59 degrees Fahrenheit [°F] or higher but lower than 72°F) and an aridic soil moisture regime (dry in all parts for more than half of the year when soil temperature is above 41°F at a depth of 20 inches; and moist in some parts for less than 90 consecutive days when soil temperature is above 46°F at a depth of 20 inches) (USDA 2006). In addition, due to periodic flooding and poor drainage, the area is high in salt concentrations.

A soil mapping unit represents an area that is dominated by one major kind of soil, or an area dominated by several kinds of soils (referred to as a complex). Each of the soil map units described has minor soils that are encompassed within the map unit. These minor soils may have different properties and limitations that can only be delineated on-site. The properties and limitations of the soil type that comprises the majority of each soil map unit are presented in this section to provide an indication of the conditions and limitations found in the ROI. The area around Lake Holloman and Lagoon G consists of two primary soil mapping units:

**Holloman-Gypsum Land Yesum Complex, 0-5 percent slopes:** This mapping unit consists of well-drained soils found on nearly level to gently sloping uplands, often associated with Alamogordo, Reeves, Tome, and Crowflat soils and typically formed in sediment of eolian and alluvial origin. The surface layer is typically very pale brown, very fine sandy loam with weak medium coarse and granular structure, approximately three inches thick. Substratum extends to a depth of 60 inches or more and is very pale brown, fine, friable sandy loam, generally moist, with brown and white gypsum found in lower portions (13 to 60 inches). This mapping unit has relatively low permeability, shrink-swell potential, and available water capacity and is moderately vulnerable to wind and water erosion. Low vegetative cover in these soils can



result in blowing dust. These soils do not provide good roadfill material and have limitations for building construction due to lower soil strength and shallow depth to bedrock (USDA 1981).

**Mead Silty Clay Loam, 0-1 percent slopes:** This mapping unit consists of deep, poorly drained soils found largely on alluvial floodplains and was formed in fine textured alluvial deposits with some addition of eolian material. Mead soils are often associated with Alamogordo, Holloman, and Yesum soils. The surface layer is approximately 5 inches thick, reddish brown, silty clay loam with prominent gypsum crystals. Substratum extends to a depth of 60 inches or more and is light reddish brown clay with prominent gypsum crystals to a depth of 48 inches. This mapping unit typically has low permeability and available water capacity and has moderately high shrink-swell potential. These soils do not provide good roadfill material and have limitations for building construction due to lower soil strength, potential to flood, and higher shrink-swell potential (USDA 1981).

### **3.5 PHYSICAL RESOURCES**

#### **3.5.1 DEFINITION OF THE RESOURCE**

This section describes the affected environment associated with solid waste management, hazardous materials and wastes, storage tanks, asbestos-containing materials (ACMs), and the Environmental Restoration Program (ERP) sites associated with the proposed construction areas.

#### ***HAZARDOUS MATERIALS/WASTES AND SOLID WASTES***

The terms “hazardous materials” and “hazardous waste” refer to substances defined as hazardous by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act (RCRA). In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous wastes that are regulated under RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR Part 261. Petroleum products include petroleum-based fuels, oils, and their wastes. The Universal Waste Program, as defined in 40 CFR Part 273, was promulgated by the USEPA in 1995 to reduce the management burden associated with recycling certain types of hazardous waste. New Mexico’s Universal Waste Rule covers certain types of batteries, pesticides, mercury-containing devices, and electric lamps. The reduced management burden associated with Universal Wastes (relative to standard RCRA Subtitle C procedures) is intended to promote increased collection and recycling. The ERP is an Air Force program to identify, characterize, and remediate environmental contamination from past activities at Air Force installations.

Issues associated with hazardous material and waste typically center around waste streams; underground storage tanks (USTs); aboveground storage tanks (ASTs); and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. When such materials are improperly used in any way, they can threaten the health and well being of wildlife species, habitats, and soil and water systems, as well as humans. This section also considers solid waste. The ROI for hazardous materials and wastes includes Holloman AFB.

Municipal solid waste management and compliance at Air Force installations is established in AFI 32-7042, *Solid and Hazardous Waste Compliance*. In general, AFI 32-7042 establishes the requirements for installations to have a solid waste management program to incorporate a solid waste management plan; procedures for handling, storage, collection and disposal of solid waste; record-keeping and reporting; and pollution prevention. AFI 32-7080, *Pollution Prevention Program*, addresses source reduction, resource recovery, and recycling of solid waste.

### **3.5.2 EXISTING CONDITIONS**

#### **3.5.2.1 HAZARDOUS MATERIALS AND WASTE**

The majority of hazardous materials used by Air Force and contractor personnel at Holloman AFB are controlled by the hazardous material facility (HAZMART) established at the Base in 1993 (Air Force 2004a). This facility tracks products used at Holloman AFB and ensures that they are utilized prior to the expiration of their shelf life. This system also operates a Just-In-Time ordering system to greatly reduce the amount of hazardous materials stored onsite. In accordance with AFI 32-7086, *Hazardous Materials Management*, the 49 CES/CEAO Hazardous Material Manager and Hazardous Materials Management Process (HMMP) Team manage HAZMAT requests and issues. Most hazardous materials used by Air Force and contractor personnel at Holloman AFB are controlled through the *Air Force Pollution Prevention Program Plan* and Holloman's *Hazardous Waste Management Plan*. This process provides centralized management of the procurement, handling, storage, and issuing of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials. Base management plans further serve to ensure compliance with applicable federal, state, and local regulations.

Holloman AFB is a large-quantity hazardous waste generator, generating more than 2,200 pounds (1,000 kilograms) of nonacute hazardous waste per month. Hazardous wastes are generated from a variety of functions on base, including aircraft and vehicle operations and maintenance; medical and dental facilities; cleaning and degreasing operations; and various maintenance and paint operations. These wastes include solvents, paints and paint-related material, absorbent material, rags and debris, blast material, and expired shelf-life material. Holloman AFB recycles lubricating fluids, batteries, oil filters, and shop rags. Hazardous wastes generated are managed in accordance with the Holloman AFB *Hazardous Waste Management Plan* (Air Force 1998).

The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. There are approximately 39 hazardous waste initial accumulation points located at Holloman AFB. Approximately 70,820 pounds of hazardous wastes were disposed of in FY 2005 (Air Force 2006).

Wastes generated on Base are managed under regulations set forth in Holloman AFB's RCRA Part B permit. Holloman AFB also holds a RCRA permit for handling the disposal and treatment of waste munitions.

#### **3.5.2.2 ENVIRONMENTAL RESTORATION PROGRAM**

ACC policy requires that any proposed project on or near a Holloman AFB ERP site be coordinated through the Holloman ERP Manager and obtain construction waivers from ACC. The proposed projects are in close proximity to ERP Site WP-49. A description of this site is found in the *Holloman Air Force Base Environmental Restoration Program Site Status Summaries* (Air Force 2005b).

ERP Site WP-49 consists of seven sewage lagoons, Lagoons A through G, and encompasses an area of approximately 100 acres. These sewage lagoons are operated in series and discharge domestic and industrial wastewater. Domestic wastewater includes wastewater from office buildings, residential housing, stores, and restaurants. Industrial wastewater is generated from aircraft washing facilities, corrosion control facilities, and machine and maintenance shops. The wastewater flows through the sewage lagoons in sequence and eventually discharge into Lake Holloman. The primary concern was the contamination of pesticides and metals. In 1996, a new WWTP was constructed on Holloman AFB and hazardous waste discharges to the lagoons stopped (Air Force 2004b). Polychlorinated biphenyl (PCB)-contaminated sludge was removed from Lagoons A and B in 1990 while all of the lagoons with the exception of Lagoon G were drained. In 1998, remedial actions were completed with the placement of soil cover over Lagoons A through F. The site was recommended for closure with long-term monitoring at that time. The New Mexico Environment Department (NMED) then released Holloman AFB from the monitoring requirements. The site was closed in FY 2005.

### **3.5.2.3 SOLID WASTE**

Solid waste generated on Holloman AFB is removed by South West Disposal and disposed at the Lincoln/Otero County Regional Landfill. Although the Holloman AFB Landfill was closed in 1996, the site is still actively monitored. Holloman AFB operates a self sustaining Qualified Recycling Program. In FY 2008, Holloman AFB generated approximately 2,450 tons of solid waste. Approximately 1,090 tons were recycled, 8,000 tons were reused, and 2.5 tons were donated. Solid waste at Holloman AFB is managed according to the Holloman AFB *Solid Waste Management Plan* (Air Force 2004c). Lincoln/Otero County Regional Landfill is a New Mexico permitted solid waste facility designed to dispose of residential, commercial, and construction waste. In 2004, the daily usage rate was 22 cubic yards. With a total capacity of about 83,893 cubic yards, it has a remaining useful life of approximately 9 years (NMED 2007).

## **3.6 BIOLOGICAL RESOURCES**

### **3.6.1 DEFINITION OF THE RESOURCE**

Biological resources include native or naturalized plants and animals and the habitats, including wetlands, in which they occur. The ROI for biological resources consists of lands within the vicinity of the proposed project areas at Holloman AFB. Although the existence and preservation of biological resources are both intrinsically valuable, these resources also provide essential aesthetic, recreational, and socioeconomic values to society. This section focuses on plant and animal species and vegetation types that typify or are important to the function of the ecosystem, are of special societal importance, or are protected under federal or state law or statute. For purposes of this assessment, sensitive biological resources are defined as those plant and animal species listed as threatened or endangered by the USFWS and species that are listed for conservation-related reasons by the state of New Mexico. Three categories of protection status are included in this section including 1) federal listed threatened and endangered species, 2) state listed species, and 3) other sensitive species.

**Federal Listed Threatened and Endangered Species.** The ESA of 1973 provides protection to species listed under this category. Endangered species are those species that are at risk of extinction in all or a substantial portion of their range. Threatened species are those that could be listed as endangered in the near future.

**State Listed Wildlife and Vascular Plants.** The New Mexico Department of Game and Fish protects state-listed animal species through state fish and wildlife administrative codes. The New Mexico EMNRD, Forestry and Resources Conservation Division, is directed to protect state listed plant species.

**Other Sensitive Species.** These are usually species of regional concern and may or may not be adopted as state or federally threatened or endangered. At present, these species receive no legal protection under the ESA, although some may be protected under other laws such as those described below.

The Bald Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) provides protection for the bald eagle and the golden eagle, prohibiting the taking, possession, or commerce of these birds.

The Migratory Bird Treaty Act of 1918 (16 USC 703-712) provides protection for migratory birds or any part, nest, or egg of such bird through conventions with other countries and prohibiting take, purchase, and transport of these birds.

In addition, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (2001), recognized the ecological and economic importance of migratory birds to this and other countries. It requires federal agencies to evaluate the effects of their actions and plans on migratory birds (with an emphasis on species of concern) in their NEPA documents. Species of concern are those identified in 1) the report "Migratory Nongame Birds of Management Concern in the United States," 2) priority species identified by established plans such as those prepared by Partners in Flight, or 3) listed species in 50 CFR 17.11, *Endangered and Threatened Wildlife*.

**Wetlands.** Wetlands are defined by the USACE and USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include marshes, bogs, and similar areas (33 CFR 328.3[b]). Wetlands provide a variety of functions including groundwater recharge and discharge; flood flow attenuation; sediment stabilization; sediment and toxicant retention; nutrient removal and transformation; aquatic and terrestrial diversity and abundance; and uniqueness. Three criteria are necessary to define wetlands: vegetation (hydrophytes), soils (hydric), and hydrology (frequency of flooding or soil saturation). Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. The USACE, the lead agency in protecting wetland resources, maintains jurisdiction over federal wetlands (33 CFR 328.3) under Section 404 of the CWA (30 CFR 320-330) and Section 10 of the Rivers and Harbors Act (30 CFR 329).

Furthermore EO 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. EO 11990 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

### **3.6.2 EXISTING CONDITIONS**

#### **3.6.2.1 VEGETATION**

Holloman AFB is located within the Chihuahuan Desert Province (Bailey 1995) and is dominated by desert shrublands and grasslands. Approximately 48 percent of the Base is comprised of patchy shrublands and dunelands including vegetated gypsum dunelands, mesquite shrublands, pickleweed shrublands, and vegetated gypsum outcrops. Gypsum interdune swale grasslands and lowland basin grasslands comprise approximately 23 percent of the Base, while the remaining 29 percent is comprised of creosote bush, fourwing saltbush, and tamarisk shrublands (Center for Environmental Management of Military Lands 2006; Muldavin *et al.* 2000).

The primary vegetation type surrounding Lake Holloman is fourwing saltbush shrublands dominated by fourwing saltbush (*Atriplex canescens*) with a moderately dense understory of alkali sacaton (*Sporobolus airoides*). Other grasses include mesa dropseed (*Sporobolus flexuosus*), Indian ricegrass (*Oryzopsis hymenoides*), and bush muhly (*Muhlenbergia porteri*). Shrubland communities found in lesser quantities around Lake Holloman include pickleweed shrublands, primarily found around the southeast corner of the lake and along some of the margins, and vegetated gypsum duneland. Pickleweed shrublands have a very sparsely vegetated understory with scattered pickleweed (*Allenrolfea occidentalis*) shrubs. Understory growth that is present may contain hairy coldenia (*Tiquilia hispidissima*), alkali sacaton (*Sporobolus airoides*), transpecos sealavender (*Limonium limbatum*), and spreading alkaliweed (*Cressa truxillensis*). Vegetated gypsum duneland is composed primarily of broom dalea (*Psoralea scoparius*), hoary rosemary mint (*Poliomintha incana*), mesa dropseed (*Sporobolus flexuosus*), honey mesquite (*Prosopis glandulosa*), and fourwing saltbush (Muldavin *et al.* 2000; Air Force 2008).

Aquatic vegetation at Lake Holloman includes emergent vegetation located primarily on the western edge and northern end of the lake. Dominant species include cattail (*Typha* spp.) and alkali bulrush (*Scirpus maritimus*). Vegetation within the constructed wetlands along the storm drainage channel between Lake Holloman and Lagoon G consists of saltgrass (*Distichlis stricta*), bulrush, saltcedar (*Tamarix ramosissima*), and fivehorn smotherweed (*Bassia hyssopifolia*). Lagoon G is primarily dominated by cattails, bulrush, saltcedar, and fivehorn smotherweed. Saltcedar is found throughout the Lake Holloman and Lagoon G Complex (Johnson and Freehling 2005; Air Force 2008).

#### **3.6.2.2 NOXIOUS WEEDS**

The Federal Noxious Weed Act of 1974 (7 USC §§ 2801-2814) defines a noxious weed as

*“any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind which is of foreign origin, is new to or not widely prevalent in the U.S., and can directly or indirectly injure crops, other useful plants, livestock, poultry or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health”.*

The New Mexico Department of Agriculture classifies noxious plants into three categories:

- Class “A” noxious plants are limited in distribution or not found in the state at the present time, but have the potential to cause serious problems.
- Class “B” noxious plants are limited to one portion of the state and high priority is given to preventing the movement into new areas.
- Class “C” noxious plants are widespread in the state.

Six noxious weeds have been documented on Holloman AFB (Table 3.6-1). These species include African rue, Malta star-thistle, Russian knapweed, Russian olive, saltcedar, and Siberian elm. Russian thistle and fivehorn smotherweed are not on the state list; however, they are non-native species that are a concern to Holloman AFB.

**TABLE 3.6-1. NOXIOUS SPECIES DOCUMENTED ON HOLLOMAN AFB**

<i>Common Name</i>	<i>Scientific Name</i>	<i>State Classification</i>
African rue	<i>Peganum harmala</i>	B
Malta star-thistle	<i>Centaurea melitensis</i>	B
Russian knapweed	<i>Acroptilon repens</i>	B
Russian olive	<i>Elaeagnus angustifolia</i>	C
Saltcedar	<i>Tamarix ramosissima</i>	C
Siberian elm	<i>Ulmus pumila</i>	C
Russian thistle	<i>Salsola kali</i>	None
Fivehorn smotherweed	<i>Bassia hyssopifolia</i>	None

Source: Johnson and Freehling 2005; Air Force 2008

Fivehorn smotherweed and saltcedar are both abundant within the Lake Holloman and Lagoon G Complex. Fivehorn smotherweed is a facultative wetland annual species found within the emergent zone of Lagoon G, and within the constructed wetlands. The invasive saltcedar is abundant along the edges of Lake Holloman, and within the entire complex. Saltcedar grows up to 15 feet in height and invades stream banks, lake margins, wetlands, and saline environments. It competes with native species, reduces the water table, and changes the hydrology of the site. Recent efforts to control this species using herbicide has killed a large majority of them, however, a significant amount are sprouting back. The saltcedar and dead wood will most likely be removed prior to opening the area up for recreation. The areas near the proposed recreational facilities will be replanted with native tree species. A few small patches of African rue and Russian thistle are also present around Lake Holloman (Johnson and Freehling 2005; Air Force 2008).

### **3.6.2.3 WILDLIFE**

Terrestrial mammals typically found within Chihuahuan Desert ecosystems and on Holloman AFB include blacktail jackrabbits (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kangaroo rats (*Dipodomys* spp.), White sands woodrat (*Neotomamicropus leucophaea*), house mouse (*Mus musculus*), long-tailed weasel (*Mustela frenata*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), and the pronghorn (*Antilocapra americana*) (Bailey 1995; Air Force 2008).

Eight species of bats have been identified on Holloman AFB. Roosting habitat is generally found in abandoned and inhabited buildings with minimal to no disturbance and culverts nearby. The playas and wetlands provide important foraging areas on the Base (Air Force 2008).

The most common terrestrial birds found within the Chihuahuan Desert ecosystems and Holloman AFB include the black-throated sparrow (*Amphispiza bilineata*), the greater

roadrunner (*Geococcyx californianus*), curve-billed thrasher (*Toxostoma curvirostre*), red-tailed hawk (*Buteo jamaicensis*), the eastern and western meadowlark (*Sturnella magna* and *S. neglecta*), and scaled quail (*Callipepla aquamata*) (Bailey 1995; Air Force 2008).

At least 17 species of reptiles have been observed on Holloman AFB including the checkered whiptail (*Cnemidophorus tesselatus*), little striped whiptail (*Cnemidophorus inornatus*), bullsnake (*Pituophis melanoleucus*), prairie rattlesnake (*Crotalis viridis*), western diamondback rattlesnake (*Crotalis atrox*), Couch's spadefoot toad (*Scaphiopus couchii*), and the Texas horned lizard (*Phrynosoma cornutum*) (Air Force 2008).

The Lake Holloman and Lagoon G Complex has been officially recognized as a state Watchable Wildlife viewing area since 1996. The Lake Holloman and Lagoon G Complex provides a variety of foraging and nesting habitat for over 73 species of migrating and resident wetlands birds (Johnson and Freehling 2005). Common species include the American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), killdeer (*Charadrius vociferous*), and Wilson's phalarope (*Phalaropus tricolor*). Over 22 species of ducks have been observed within the complex, 15 of which are considered frequent visitors. The most common species are the northern shoveler (*Anas chlypeata*) and the ruddy duck (*Oxyura jamaicensis*). Several species of raptor are common as well, including the peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), and the northern harrier (*Circus cyaneus*) which currently nest in the complex (Johnson and Freehling 2005; Air Force 2008).

The only fish species currently present in Lake Holloman, Lagoon G, and the ditches is mosquito fish (*Gambusia affinis*) which were introduced by the New Mexico Department of Game and Fish to control mosquito populations. Non-native fish would not be introduced into the Lake Holloman and Lagoon G Complex and live bait would not be permitted. The introduction of any other native fish species would be in consultation with New Mexico Department of Game and Fish.

#### **3.6.2.4 THREATENED AND ENDANGERED SPECIES**

Two federally endangered species have been observed on Holloman AFB, the northern aplomado falcon (*Falco femoralis*) and the interior least tern (*Sterna antillarum athalassos*). The northern aplomado falcons that have been observed on Holloman AFB are part of a Nonessential Experimental Population under Chapter 10(j) of the ESA that was released on White Sands Missile Range in 2007. This species has not been observed in the complex, however the grasslands surrounding Lake Holloman provide potential foraging habitat. The interior least tern is considered a rare migrant to the complex and has not been observed breeding.

An additional 31 state-listed species or species of concern have been observed on Holloman AFB. Of these, five species have been observed within the Lake Holloman and Lagoon G Complex (Table 3.6-2). These include the peregrine falcon, western snowy plover (*Charadrius alexandrinus*), northern harrier, the white-faced ibis (*Plegadis chihi*), and the mountain plover.

The peregrine falcon is primarily a terrestrial species, but has been observed foraging within the wetland complex. The western snowy plover is a former federal Category 2 species and is currently a federal species of concern. It is a commonly observed species and has been known to nest within the mudflats, dry salt flats, and playas of the Lake Holloman and Lagoon G Complex, and most commonly within Stinky Playa. Nesting occurs from May 16 through July 11 (Air Force 2008).

**TABLE 3.6-2. STATE LISTED SPECIES AND SPECIES OF CONCERN OBSERVED ON  
HOLLOMAN AFB  
(PAGE 1 OF 3)**

<i>Common Name</i>	<i>Scientific Name</i>	<i>State Status</i> <sup>1</sup>	<i>Federal Status</i> <sup>2</sup>	<i>Observed in Project Area</i>
<b>FISH</b>				
White Sands Pupfish	<i>Cyprinodon tularosa</i>	T	G	Present on Holloman AFB; not likely to occur within the project area
<b>REPTILES</b>				
Texas Horned Lizard	<i>Phrynosoma cornutum</i>		S	Present on Holloman AFB; not likely to occur within the project area
<b>BIRDS</b>				
White-Faced Ibis	<i>Plegadis chihi</i>	S		Present on Holloman AFB; Frequent migrant in project area
Northern Harrier	<i>Circus cyaneus</i>		BCC	Present on Holloman AFB; Observed nesting in project area
Northern Gray Hawk	<i>Buteo nitidus maxima</i>	S	S	Present on Holloman AFB; Potential to occur within the project area, but has not been observed
Ferruginous Hawk	<i>Buteo regalis</i>		S, BCC	Present on Holloman AFB; Potential to occur within the project area, but has not been observed
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T		Present on Holloman AFB; Potential to occur within the project area, but has not been observed
Peregrine Falcon	<i>Falco peregrinus</i>	T	M	Present on Holloman AFB; Observed foraging in project area
Northern Aplomado Falcon	<i>Falco femoralis</i>	E	E	Present on Holloman AFB; Potential to occur within the project area, but has not been observed
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>		BCC	Present on Holloman AFB; Observed nesting in project area
Mountain Plover	<i>Charadrius montanus</i>	PT	PT	Present on Holloman AFB; Accidental (one successful nesting in 1987) in project area



**TABLE 3.6-2. STATE LISTED SPECIES AND SPECIES OF CONCERN OBSERVED ON  
HOLLOMAN AFB  
(PAGE 2 OF 3)**

<i>Common Name</i>	<i>Scientific Name</i>	<i>State Status<sup>1</sup></i>	<i>Federal Status<sup>2</sup></i>	<i>Observed in Project Area</i>
Long-billed Curlew	<i>Numenius americanus</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Interior Least Tern	<i>Sterna antillarum athalassos</i>	E	E	Present on Holloman AFB; Rare migrant in project area
Black Tern	<i>Chlidonias niger</i>		S	Present on Holloman AFB; not likely to occur within the project area
Western Burrowing Owl	<i>Athene cunicularia hypugea</i>		S, BCC	Present on Holloman AFB; not likely to occur within the project area
Costa's Hummingbird	<i>Calypte costae</i>	T		Present on Holloman AFB; not likely to occur within the project area
Crissal Thrasher	<i>Toxostoma crissale</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Loggerhead Shrike	<i>Lanius ludovicianus</i>		S, BCC	Present on Holloman AFB; not likely to occur within the project area
Sprague's Pipit	<i>Anthus spragueii</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Cassin's Sparrow	<i>Aimophila cassinii</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Sage Sparrow	<i>Amphispiza belli</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Lark Bunting	<i>Calamospiza melanocorys</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Baird's Sparrow	<i>Ammodramus bairdii</i>	T	S, BCC	Present on Holloman AFB; not likely to occur within the project area
McCown's Longspur	<i>Calcarius mccownii</i>		BCC	Present on Holloman AFB; not likely to occur within the project area
Chestnut-collared Longspur	<i>Calcarius ornatus</i>		BCC	Present on Holloman AFB; not likely to occur within the project area

**TABLE 3.6-2. STATE LISTED SPECIES AND SPECIES OF CONCERN OBSERVED ON  
HOLLOMAN AFB  
(PAGE 3 OF 3)**

<i>Common Name</i>	<i>Scientific Name</i>	<i>State Status<sup>1</sup></i>	<i>Federal Status<sup>2</sup></i>	<i>Observed in Project Area</i>
<b>MAMMALS</b>				
Western Small-footed Myotis Bat	<i>Myotis ciliolabrum</i>	S	S	Present on Holloman AFB; not likely to occur within the project area
Spotted Bat	<i>Euderma maculatum</i>	T	S	Present on Holloman AFB; not likely to occur within the project area
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>	S	S	Present on Holloman AFB; not likely to occur within the project area
Rock Squirrel	<i>Spermophilus variegatus</i>	S		Present on Holloman AFB; not likely to occur within the project area
Plains Pocket Mouse	<i>Perognathus flavescens</i>	S		Present on Holloman AFB; not likely to occur within the project area
Ringtail	<i>Bassariscus astutus</i>	S		Present on Holloman AFB; not likely to occur within the project area
<b>PLANTS &amp; LICHENS</b>				
Paperspine Fishhook Cactus	<i>Sclerocactus papyracanthus</i>	S	S	Present on Holloman AFB; not likely to occur within the project area
Gypsophilous lichen	<i>Acarospora clauzadeana</i>		GI/SI	Present on Holloman AFB; not likely to occur within the project area

Notes: 1. E - Endangered. Any species or subspecies whose prospects of survival or recruitment in New Mexico is in jeopardy; T- Threatened. Any species or subspecies whose prospects of survival or recruitment in New Mexico is likely to be in jeopardy within the foreseeable future; S - sensitive. Any species that deserves special consideration in management and planning, but has no legal requirements.

2. E - Endangered; T- Threatened ; PT - Taxa proposed to be listed as threatened.; CW -Warranted to be listed, but has been precluded from listing; S - Federal Species of Concern (formerly labeled as candidate species, taxa for which the USFWS has enough substantial evidence on biological vulnerability and threat(s) to support proposals to list as endangered or threatened species); BCC - USFWS Bird of Conservation Concern. Species identified as requiring conservation action to ensure long-term population stability which would preclude listing as Federally Threatened or Endangered; G- currently precluded from listing because a formal species conservation plan is in place; M - species currently in population monitoring phase following delisting action; GI/SI = Critically imperiled globally/In-state because of extreme rarity

Source: Johnson and Freehling 2005; Air Force 2008

The white-faced ibis has been observed on a regular basis within the mudflats and emergent vegetation at the Lake Holloman and Lagoon G Complex during spring (April and May) and fall (August and September) migration. Occasional non-breeding individuals have been known to overwinter there. The northern harrier has been observed nesting in the wetland complex since 1995. The mountain plover is considered accidentally occurring in the Lake Holloman area, but one successful nesting attempt occurred in 1987 (Air Force 2008).

The northern gray hawk (*Buteo nitidus maxima*), ferruginous hawk (*Buteo regalis*), and the bald eagle (*Haliaeetus leucocephalus*) are state-listed species that have been observed on Holloman AFB, but not within the Lake Holloman and Lagoon G Complex. However, potential habitat does exist for these species.

The White Sands Pupfish (*Cyprinodon Tularosa*) is a state-listed species that was introduced into the Lost River basin on Holloman AFB in 1970. The pupfish were distributed in three stream segments: the Malone-Ritas Draw segment above Range Road 9; the trench segment between Range Road 9 and the Lost River basin; and the dunes segment downstream from the basin (Air Force 2008). These stream segments are located on the northern portion of Holloman AFB near the High Speed Test Track and are only connected to each other during heavy rains or heavy run-off from the Sacramento Mountain escarpment. These stream segments are located several miles north of the Lake Holloman and Lagoon G Complex (Figure 3.6-1). Attempts to reintroduce pupfish in experimental ponds or in areas in or around the project area have been unsuccessful (personal communication, Westphal 2009).

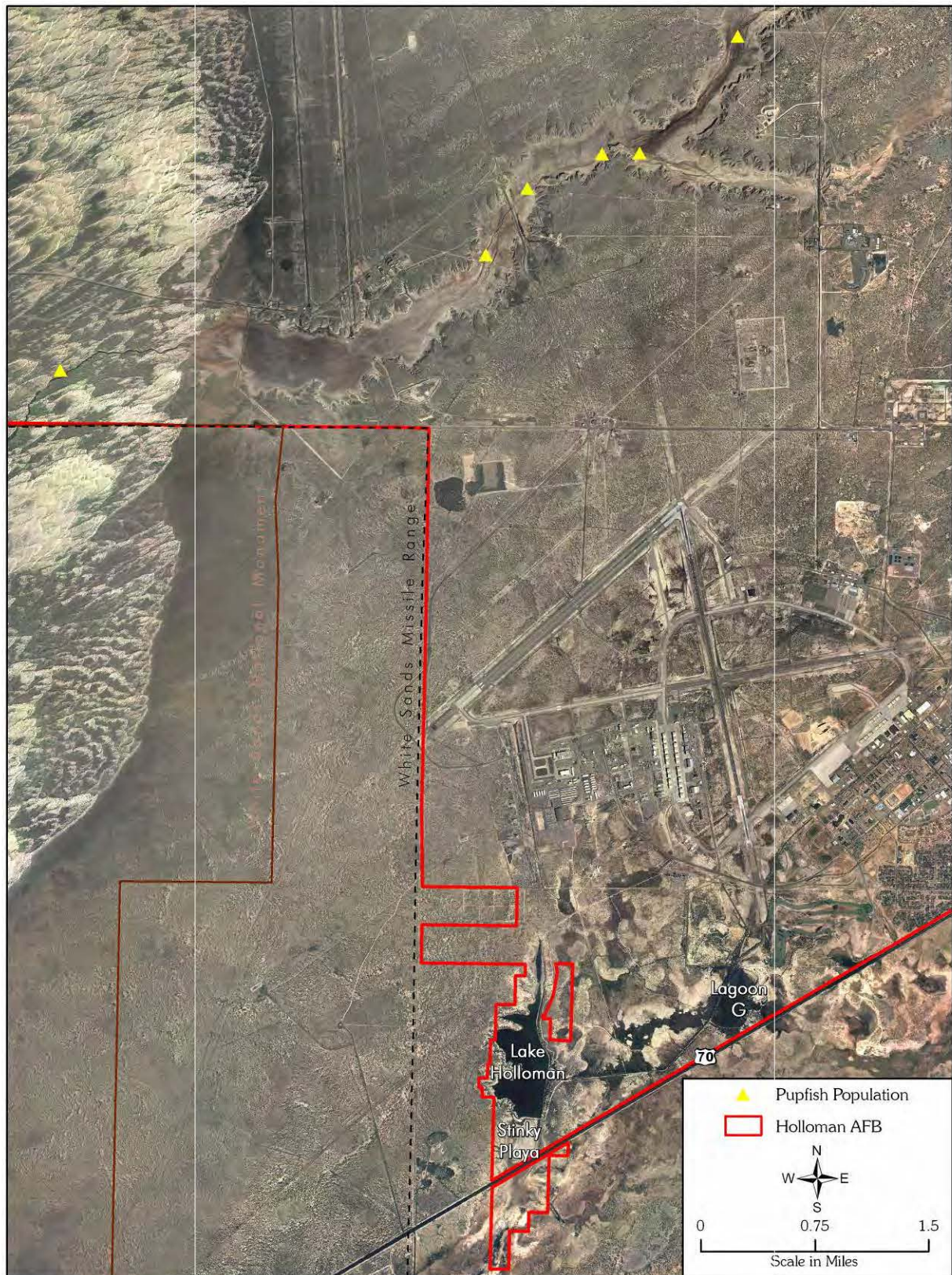
The remaining state-listed species in Table 3.6-2 have been observed on Holloman AFB, but have not been observed within the Lake Holloman and Lagoon G Complex, and are not likely to occur due to lack of suitable habitat.

### **3.6.2.5 WETLANDS**

Wetlands are areas of transition between terrestrial and aquatic systems and are defined by the USACE as "...those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The USACE Wetlands Delineation Manual states that a wetland must meet the technical criteria for three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology (Environmental Laboratory 1987).

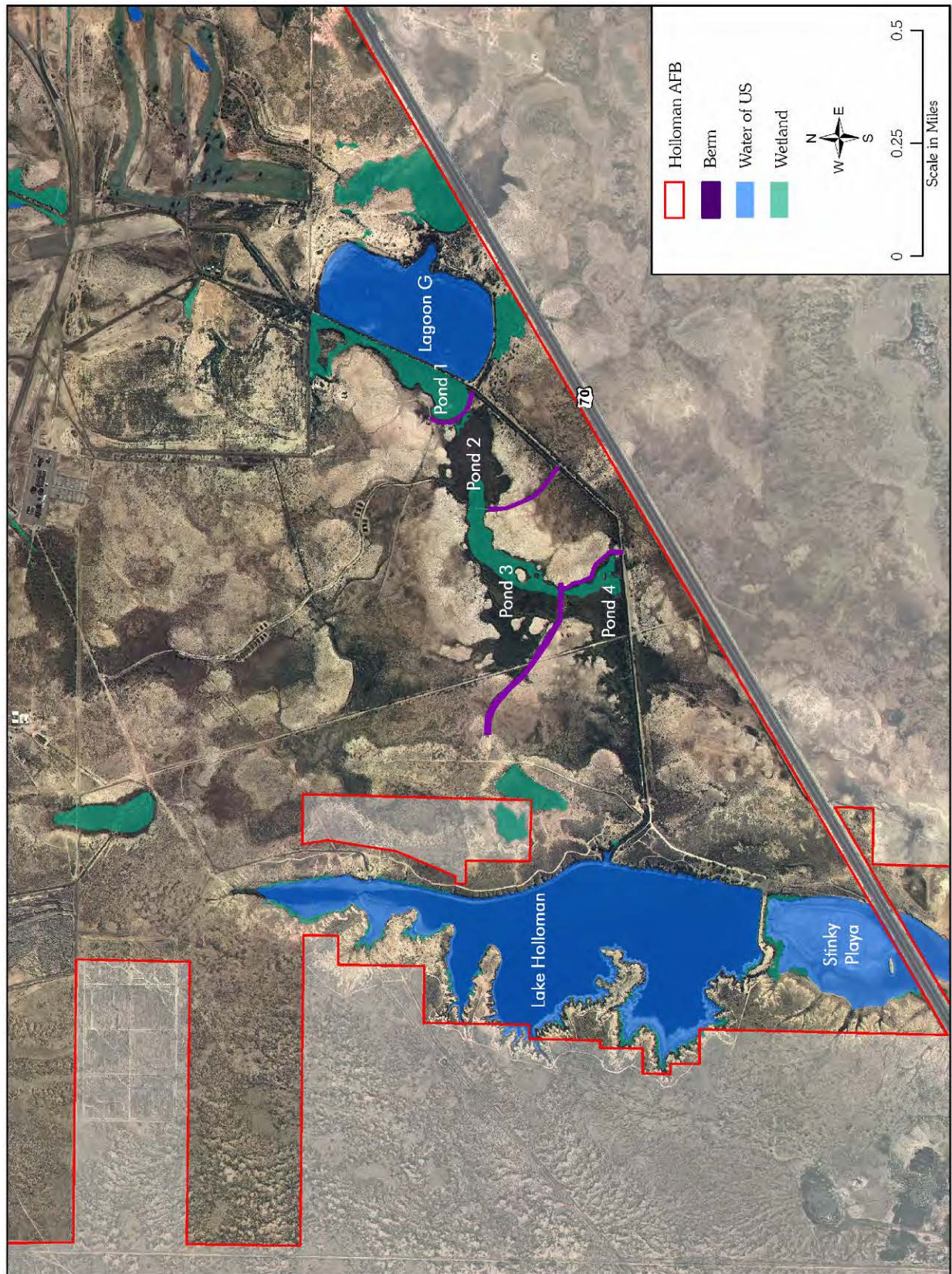
Wetlands perform a variety of important functions including providing habitat for fish and wildlife, erosion control, storm buffering, storage of flood waters, nutrient cycling and water quality control. Approximately 120 acres of wetlands occur on Holloman AFB (Figure 3.6-2) (Air Force 2008). A wetland delineation per the USACE methods was conducted on Holloman AFB in 1996. Recent Supreme Court rulings have revised the interpretation of the CWA defining jurisdictional wetlands. Therefore, it is unclear whether previously identified jurisdictional wetlands would remain jurisdictional under the new interpretation. According to the Holloman AFB INRMP, a new wetlands delineation will be conducted in FY 2010 (Air Force 2008).





**FIGURE 3.6-1. WHITE SANDS PUPFISH LOCATIONS**





**FIGURE 3.6-2. LAKE HOLLOMAN LAGOON G COMPLEX**

Within the Lake Holloman and Lagoon G Complex there are four wetlands (Ponds 1-4) that were constructed in 1996 for the primary purpose of providing a disposal area for treated sewage effluent from the WWTP on Base. Hydrology is managed in order to encourage wetland birds and their invertebrate prey, discourage encroaching wetland vegetation and mosquitoes, provide recreation opportunities, and for providing stormwater and wastewater management (Johnson and Freehling 2005; Air Force 2008). Water levels within these wetlands are managed by controlling the outflow through several sluice gates. These wetlands consist of mudflat, shallow water, and playa habitat that provide quality wildlife habitat for migrating and breeding wetland birds (Johnson and Freehling 2005; Air Force 2008).

Emergent wetlands also occur along the margins of Lake Holloman primarily on the western edge and northern end of the lake. Dominant species include cattail and alkali bulrush. Adjacent to Lake Holloman is Stinky Playa. Stinky Playa is an alkaline playa lake that was once contiguous with Lake Holloman prior to the construction of the dam created in the 1960's that currently separates them. Stinky Playa receives brackish groundwater input as well as periodic discharges from Lake Holloman. Its water depth varies from having no water to as much as five feet. Stinky Playa provides crucial nesting and foraging habitat for migrating and residential water birds (Davis *et al.* 1993; Air Force 2008).

## **3.7 WATER RESOURCES**

### **3.7.1 DEFINITION OF THE RESOURCE**

Water resources analyzed in this EA include surface water, groundwater, water quality, and floodplains. Further, this section provides descriptions of the qualitative and quantitative characteristics of water resources. Wetlands are discussed in Section 3.3, Biological Resources, and drinking water wells, wastewater facilities, and stormwater infrastructure are discussed in Section 3.11, Infrastructure.

Surface water resources include lakes, rivers, and streams and are important for a variety of reasons including irrigation, power generation, recreation, flood control, and human health. Under the CWA, it is illegal to discharge pollutants from a point source into any surface water without an NPDES permit. The USEPA has the authority to set standards for the quality of wastewater discharges. The goal of the CWA Section 402 is the "restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters." Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the U.S. must obtain certification from the state in which the discharge would originate, or if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval [such as issuance of a Section 404 permit]) must also comply with CWA Section 401. The State of New Mexico does not have the legal authority to implement and enforce the provisions of the CWA, so all NPDES permits in the state are issued by the USEPA Region 6, with assistance and oversight by the State of New Mexico.

Groundwater includes the subsurface hydrologic resources of the physical environment and is by and large a safe and reliable source of fresh water for the general population, especially for those in areas of limited precipitation, and is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater plays an important role in the



overall hydrologic cycle. Its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

For the purpose of this analysis, surface water quality is defined as the chemical, physical, and biological characteristics of surface waters in regards to its suitability for a particular use (U.S. Geological Survey 2008). Water quality is determined suitable for a use when state and federal standards for particular parameters are met.

Section 305(b) of the CWA requires states to submit a report to the USEPA every two years on the water quality of all water bodies within the state. In addition, Section 303(d) requires each state to create a list of water bodies that do not meet water quality standards and, therefore, are considered impaired. This information helps characterize the general quality of waters in a particular region.

### **STATE REGULATIONS AND WATER QUALITY STANDARDS**

The NMED has established rules for Water Use Classifications and Water Quality Standards (Title 20 Chapter 6, Part 4) in accordance with the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal CWA, as amended (33 USC Section 1251 *et seq.*). New Mexico water quality standards consist of two categories: general criteria that apply to all waters, and specific criteria applicable to attainable or designated use. Current and proposed designated uses for the Lake Holloman Wetland Complex include secondary contact<sup>F1F</sup> (e.g., boating and fishing), wildlife habitat, and aquatic life. Lake Holloman is classified as a warm water lake and therefore water quality standards specific to warm waters would apply. Goals are to maintain water quality sufficient to protect existing, designated uses, and to permit only those activities that would not cause violations of the quantitative standards.

Floodplains are defined by EO 11988, *Floodplain Management*, as “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year” (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, as well as promoting stream bank stability and regulating water temperatures. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

The ROI for water resources considered in this EA includes Lake Holloman, as well as nearby surface waters that receive runoff generated within the project area.

### **3.7.2 EXISTING CONDITIONS**

#### **3.7.2.1 SURFACE WATER**

Lake Holloman lies within the Tularosa Valley in southern New Mexico. The Tularosa Valley is a large hydrologic closed basin covering approximately 6,500 square miles with no through-

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<sup>1</sup> “Secondary contact” is defined by the state of New Mexico as “any recreational or other water use in which human contact with the water may occur and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, wading, commercial and recreational boating and any limited seasonal contact.”

flowing surface water features. Prominent surface water features in the area, such as Lost River and the Sacramento River, are sustained by groundwater or are perennial in nature and exist in a few areas within the higher elevations of the Sacramento Mountains.

Prominent surface water features directly within the ROI include several manmade features that form a connected hydrologic system: Lake Holloman, Lagoon G, Stormwater Drainage Canal, and Stinky Playa. Lake Holloman is the largest reservoir of permanent water in the area and is supplied primarily from a combination of brackish groundwater and surface water runoff and effluent. It was formed in 1965 by the construction of a non-engineered earthen dam midway along an existing playa (ephemeral lake) as part of a lagoon system to receive effluent from the sewage WWTP located at Holloman AFB. In 1996, a wetland delineation from the USACE designated Lake Holloman as a Waters of the U.S. As a result, Lake Holloman is assigned an NPDES permit to cover the wastewater effluent discharge from the WWTP as well as stormwater permit for construction projects larger than one acre. Lake Holloman is supplied by groundwater and receives water from the stormwater canal, Lagoon G, and effluent from the WWTP (Figure 1.2-1) (Air Force 2008, Huff 2004).

Surface water runoff within Holloman AFB is dominated by a network of manmade ditches, storm drains, and drainage swales. Drainage occurs by overland flow to storm drain inlets connected to a series of underground pipes, or percolates into the groundwater system via subsurface soils. Surface and subsurface drainage structures within Holloman AFB direct stormwater to 14 stormwater outfalls (Drainage Areas 001 through 014). Twelve of the 14 outfall drainage areas on Holloman AFB have been identified as contributing to waters of the U.S. Lake Holloman, considered a waters of the U.S., receives water from Drainage Areas 001, 010, and 011 (Air Force 2005c).

The USEPA Region 6, with assistance and oversight by the State of New Mexico, has adopted final stormwater permits for industrial discharges under the NPDES program. Holloman AFB is required to obtain an NPDES permit because it discharges stormwater to surface waters of the U.S. and is currently covered under the Multi-Sector General Permit for Industrial Activities (MSGP-2000). A Stormwater Pollution Prevention Plan (SWPPP) has been developed for Holloman AFB to protect ground water resources and applies to pollution prevention practices on the installation as they relate to stormwater runoff.

### **3.7.2.2 GROUNDWATER**

The Tularosa Basin was formed as a structural trough during the Middle to Late Cenozoic era. Alluvial fill deposition includes sand, gravel, and clay in alluvial fans along the basin margins and extensive lake, alluvial, and evaporate deposits within the interior basin. Streams sustained by groundwater discharge within the basin include Salt Creek and Malpais Spring. It is estimated that the ground water resources of the Tularosa Basin contains over 100 million acre-feet of brackish ground water. A wide range of water chemistries including sodium chloride, carbonate, and sulfate-based brine waters exist in the basin and water with salinity from 1,000 ppm total dissolved solids (TDS), approximate to fresh water, to over 20,000 ppm TDS, approximate to sea water, can be found within the basin (Huff 2004).

### **3.7.2.3 WATER QUALITY**

No recent water quality data are available for Lagoon G or the constructed wetlands. However, water quality for the stormwater drainage areas (or outfalls) entering Lagoon G, the wetlands, and Lake Holloman (Drainage Areas 001, 009, 010, and 011) as well as the WWTP effluent

entering Lagoon G has been measured in accordance with Holloman AFB NPDES permits. NPDES monitoring requirements and water quality measurements are presented in the 2005 SWPPP and the 2008 draft SWPPP for each of the drainage areas.

Recent 2008 water quality data for Lake Holloman has been obtained from New Mexico State University and the NMED (Boeing 2008; Davis 2008a and 2008b). While these data provide a glimpse into the current conditions at Lake Holloman, the lab analysis is not yet complete for all of the parameters that were sampled. In addition, these data only represent water quality for a few months at surface and one meter depths. As such, these 2008 data presented should be considered provisional as they have not yet been subjected to a rigorous quality assurance, validation, and verification process required once all data are received. A more thorough water quality analysis was completed in 1981 by the BLM, and provides insight into the limnology of Lake Holloman (Cole *et al.* 1981). However, water quality represented in this report may not reflect current conditions because the quality of the water and the volume of water flow entering the lake from the sewage treatment plant has changed since the construction of an upgraded WWTP in 1996.

**Temperature, Salinity, and Stratification.** Lake Holloman is a remnant playa primarily fed by brackish groundwater. In addition, Lake Holloman receives freshwater inputs from the stormwater runoff drainage canal, Lagoon G, and effluent from the WWTP. The amount of effluent entering Lake Holloman is adjusted depending on the water requirement of Lagoon G and the constructed wetlands. This influx of fresh water, however, does not have a significant effect on water levels or salinity of the lake. Past studies on Lake Holloman report the salinity to average midway between fresh water salinity (<0.5 parts per thousand [ppt]) and the ocean (35 ppt) (Cole *et al.* 1981; Boeing 2008). However, analysis by Holloman AFB water quality specialists report that salinities are in fact higher, and range from 40 to 45 ppt (Griffin 2008). Specific conductivity measurements taken in 2008 ranged between 44,202 umoh/cm and 47,506 umoh/cm (Davis 2008b; Boeing 2008).

Past studies have shown that Lake Holloman is not subject to significant seasonal stratification and mixing due to its shallow depth, windy environment, and high diurnal heat flux. However, these same conditions do cause a diurnal mixing and stratification to take place. This, in turn, can cause significant fluctuations in temperature and oxygen levels. Water temperatures influence a variety of factors within a lacustrine system. For example, it affects the amount of dissolved oxygen water can hold, the rate of photosynthesis, the metabolic rates of organisms, and the sensitivity of organisms to pollutants (Cole *et al.* 1981). Water temperature in Lake Holloman fluctuates significantly both diurnally and annually, ranging from 45°F in the winter to 86°F in the summer at the surface (Boeing 2008; Cole *et al.* 1981).

**pH.** pH is a measure of how acidic a solution is. A solution is considered acidic if the pH is less than seven. Most aquatic organisms require an environment with a pH level between five and nine. Healthy environments with brackish water tend to have a stable pH since salt water resists changes to pH. pH is tied directly to photosynthesis and the amount of carbon dioxide in the water. Small changes in the pH can also affect the solubility of some metals and can increase the biological toxicity within the water column. Events such as algal blooms, water turbulence, runoff, and acid rain can alter the pH and be harmful to the organisms within the lake (Ohrel and Register 2006). The NMED water quality standard for pH for aquatic life in warm waters is within the range of 6.6 to 9.0. The pH of Lake Holloman ranges from 7.0 to 9.9 (Boeing 2008).

**Oxygen.** Dissolved Oxygen (DO) is essential for all lacustrine organisms. Oxygen levels in brackish waters reflect the result of multiple, simultaneous processes that produce oxygen (e.g., photosynthesis) and consume oxygen (e.g., bacterial decomposition of organic material such as detritus). Inputs of oxygen-consuming materials can be from both natural sources, such as inputs of organic material from primary productivity (algae and plankton), and from anthropogenic inputs such as wastewater effluent and stormwater runoff from urban and agricultural areas. Where sulfur is common, as it is in Lake Holloman, oxygen-depleted environments can form toxic hydrogen sulfide (Cole *et al.* 1981). Anaerobic environments can also create a favorable environment for anaerobic bacterium, *Clostridium botulinum* (Botulism), which often occurs following massive mortalities of fish or invertebrates. This could potentially cause waterfowl toxicity when birds eat contaminated fish or larvae (Cole *et al.* 1981).

The NMED water quality standard for DO for aquatic life in warm waters is 5.0 milligrams per liter (mg/L) or above. Levels below 2 mg/L are considered hypoxic and can be detrimental to organisms. In April 2008, DO (mg/L) at the surface ranged from 4.7 to 6.0 (Boeing 2008), in May it ranged from 5.9 to 8.4, and in July it ranged from 5.7 to 5.9 (Davis 2008b). DO at one meter ranged from 1.9 in July to 8.8 in April (Davis 2008b). DO concentrations in 1981 were variable depending on the time of day and the time of year with almost complete depletion of oxygen in deeper water during the night, or in shallower waters on calm days. Oxygen concentrations peaked in shallow waters during windier days when mixing occurred (Cole *et al.* 1981).

**Nutrients.** While some nutrient inputs into surface waters are considered natural and are necessary for a properly functioning ecosystem, excess concentrations from activities such as agriculture, sewage effluent, and stormwater runoff can be unhealthy and cause eutrophication. Harmful algae blooms and excessive amounts of macrophytes can develop rapidly as a result of increased nutrients. Algae blooms do occur within Stinky Playa on a regular basis, creating a smelly odor along the mudflats (Cole *et al.* 1981). The NMED does not have quantitative criterion for nutrients, but instead states that “*Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.*” Lake Holloman is classified as hypereutrophic (Cole *et al.* 1981). Total Kjeldahl nitrogen in Lake Holloman ranged from 11 to 20 mg/L in May and July of 2008, respectively. Total phosphorus ranged from 0.3 to 0.8 mg/L May and July of 2008, respectively. The NMED does have acute and chronic criteria for ammonia for aquatic life, based on pH and temperature, and the presence of salmonids. Preliminary data show that ammonia in Lake Holloman met the state water quality standards, with values ranging from 0.1 to 0.2 mg/L in May and July of 2008, respectively (Davis 2008a).

**Contaminants.** Potential pollutants that might be present in stormwater flows discharging into the Lake Holloman and Lagoon G Complex may include petroleum hydrocarbons associated with fuels or vehicle fluids (numerous parking areas), suspended solids and eroded soils from one of several unvegetated open areas or dirt parking areas, firefighting activities or hydrant flushings, potable water discharges, uncontaminated air conditioning or compressor condensate, irrigation and landscape watering or drainage, pavement wash waters, groundwater, foundation or footing drains, and incidental wind blown mist from cooling towers. Occasional spills or catastrophic events may include engine oil, JP-8, diesel fuel, gasoline, engine coolant, or other transportation related fluid. Large organic chemical spills are unusual and normally in small un-reportable quantities (Air Force 2005b). While data is incomplete and has not yet undergone the rigorous quality assurance/quality control process

required once all data are received, a preliminary assessment appears to show that water quality standards for wildlife habitat, aquatic life, and human health are met for those analyzed (Davis 2008a).

**Fecal Coliform Bacteria.** Bacteria and other pathogens are associated with fecal waste and can cause a variety of diseases. The presence of *fecal coliforms* bacteria are used as indicators of fecal contamination from human or warm-blooded animals such as livestock or waterfowl. The NMED standards for primary contact require a monthly geometric mean of *E.coli* bacteria less than 126 colony forming units (cfu)/100 milliliter (mL) and a single sample to be less than 410 cfu/100 mL. Secondary contact requires a monthly geometric mean less than 548 cfu/100mL and a single sample to be less than 2507 cfu/100 mL. There has not been enough recent measurements of *E.coli* at Lake Holloman to determine a monthly geometric mean, however, preliminary data from Lake Holloman taken in July of 2008 showed *E.coli* levels as high as 960.6 cfu/100mL, which exceed single sample standards for primary contact, but meet the criteria for secondary contact (Davis 2008b).

**Summary.** Preliminary analysis of existing water quality data for Lake Holloman suggest that water quality standards for wildlife habitat, aquatic life, and secondary contact are met, however *E.coli* samples suggest that primary contact standards are not. Since water quality data is still preliminary, and much of it is incomplete and still awaiting analysis, any decision as to the use of the lake for secondary contact boating and fishing will be determined by the State of New Mexico upon completion of their testing and analysis.

### **3.7.2.4 FLOODPLAINS**

The floodplains associated with the hydrological system comprised of Lake Holloman, the stormwater canal, and Lagoon G Complex area are protected for discharge of treated effluent from the Holloman AFB WWTP and because of ecological value (Air Force 2008).

## **3.8 CULTURAL RESOURCES**

### **3.8.1 DEFINITION OF THE RESOURCE**

Cultural resources include districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. In addition, American Indian sacred sites or traditional resources that may not be historic properties are considered cultural resources. The American Indian and Alaska Native Policy emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis to assess the effects of proposed DoD actions upon protected tribal resources, tribal rights, and Indian lands before decisions are made by the services.

### **LEGISLATION**

Section 106 of the NHPA (16 USC 470f) requires federal agencies to take into account the effects of their undertakings on historic properties and afford the ACHP a reasonable opportunity to comment on such undertakings. The Section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to

identify historic properties potentially affected by the undertaking, assess effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

The Proposed Action constitutes an “undertaking,” and thus is subject to Section 106. 36 CFR Part 800, regulations implementing Section 106, defines an undertaking as “any project, activity or program that can result in changes in the historic character or use of historic properties, if any such historic properties are located in the area of potential effects” (36 CFR 800.2[o]).

### **3.8.2 EXISTING CONDITIONS**

#### **3.8.2.1 ARCHEOLOGICAL RESOURCES**

##### **BACKGROUND**

Archaeological evidence reveals that humans have lived in the Tularosa basin for more than 10,000 years. The initial cultural historical framework for the region was defined by Lehmer (1948) and has been refined by later investigators including MacNeish and Beckett (1987), Whalen (1981, 1994), and Miller (1989, 2001), among others. While some debate exists regarding the likely transition dates between periods and phases and also concerning some aspects of diagnostic material culture, the generally accepted regional chronology is summarized in Table 3.8-1.

**TABLE 3.8-1. REGIONAL CHRONOLOGY**

<i>Period</i>	<i>Phase</i>	<i>Approximate Dates</i>
Paleoindian		10,000 - 6,000 BC
	Clovis	10,000 - 9,000 BC
	Folsom	9,000 - 8,500 BC
	Plano	8,500 - 5,500 BC
Archaic		6,000 BC - AD 200
	Early	6,000 - 4,300 BC
	Middle	4,300 - 900 BC
	Late	900 BC - AD 200
Formative		AD 200 - 1400
	Mesilla	AD 200 - 1100
	Doña Ana	AD 1100 -1200
	El Paso	AD 1200 -1400
Protohistoric	-	AD 1400 - 1659
Historic	-	AD 1659 - 1950

##### **PALEOINDIAN PERIOD (10,000-6,000 BC)**

The earliest firmly documented occupation of the American continent is called the Paleoindian Period. It is generally considered to date from about 10,000 to about 6,000 years BC. The archaeological evidence suggests that during this time the earliest Americans were highly nomadic hunters and gatherers. Populations were likely small and dispersed, exploiting a variety of wild food resources but largely focused towards now-extinct megafauna.



Archaeological sites are typically characterized by distinctive stone spear points, including the widespread Clovis and Folsom styles. Although the Paleoindian Period has been broadly documented across all of North and South America, archaeological evidence is patchy for any location and relatively little is known about this earliest period in southern New Mexico. Isolated projectile points and other diagnostic tool types (Elyea 1988) have been found at widespread locations and a small handful of Paleoindian sites have been excavated in the region (Carmichael 1983).

Despite some evidence of a pre-Clovis occupation, the Clovis period (ca. 10,000-9,000 BC) is the first firmly documented human occupation in southern New Mexico. The Mockingbird Gap site north of Holloman is the best documented Paleoindian site in the region. Excavated in the 1960s, this site has yielded the largest assemblage of Clovis period artifacts from southern New Mexico (Weber and Agogino 1997). Folsom period materials have been reported from Holloman sites and abundant Folsom materials have been found at Lone Butte, 10 miles south of Holloman (Amick 1994). Plano period (8,500-6,000 BC) materials are not common in the area, but have been reported near Orogrande (Seaman *et al.* 1988) and along the Otero Mesa escarpment (Graves *et al.* 1997).

#### **ARCHAIC PERIOD (6,000 BC – AD 200)**

Near the end of the Paleoindian Period, global climate began to change slowly, becoming gradually warmer and dryer. In response, plant and animal populations also changed and the human populations began to exploit a wider variety of food resources. Large game was no longer the primary focus of subsistence. Changes in technology included a more diverse suite of lithic tools, increased use of grinding stones, and the development of basketry. Pottery is absent. MacNeish and others (MacNeish *et al.* 1993, MacNeish and Beckett 1987) have identified four phases within the Archaic: the Gardner Springs Phase (6,000 to 4300 BC), the Keystone Phase (4300 to 2600 BC), the Fresnal Phase (2600 to 900 BC), and the Hueco Phase (900 BC to AD 200). Each of these phases is characterized by differences in lithic tool technology and resource exploitation strategies. By the end of the Archaic, many regions have evidence of a slow transition from mobile hunter-gatherers to semi-sedentary horticultural populations. Within the southern New Mexico region, Archaic sites are notably more common than Paleoindian sites.

#### **FORMATIVE PERIOD (AD 200 – 1400)**

During the late Archaic and early Formative, distinct regional adaptations began to develop. Horticulture became fully adopted and increasingly supplemented the gathering of wild plant resources. As a result, human populations became larger and more sedentary; settlements (sites) and house structures became larger and more permanent (Stuart and Gauthier 1981). In southern New Mexico, a defining characteristic of the Formative is the development of brownware ceramics, with black-on-white decorated pottery appearing after about AD 750. Stone tool technology became more diverse and specialized. Trading networks were well developed, as evidenced by Pacific and Gulf coast marine shell, Mexican copper bells, and point-sourced turquoises and obsidians.

Locally, three phases have been defined within the Formative: the Mesilla Phase (AD 200 to 1100), the Doña Ana Phase (AD 1100 to 1200), and the El Paso phase (AD 1200 to 1400/1450). Each phase is differentiated and recognized archaeologically primarily on the basis of differences in ceramics. A variety of decorated ceramic wares have been well dated, including

black-on-whites, black-on-reds, red-on-browns, terracottas, polychromes, and glazes (Stuart and Gauthier 1981).

#### ***PROTOHISTORIC PERIOD (AD 1400-1659)***

At the end of the Formative, many horticultural villages in the southern New Mexico region were abandoned in response to extended drought. During the early Protohistoric, the surviving local populations were sparse and returned to a semi-nomadic subsistence pattern (Upham 1984). Occupation of the Tularosa Basin during the Protohistoric period is not well understood. Early Spanish explorers reported a variety of cultural groups in the area including the Suma, Manso, Jumano, and Apache (Sale *et al.* 2002:14). These groups followed a traditional foraging subsistence economy supplemented by limited horticulture and may have been descendants of Puebloan peoples.

It is not clear when the Mescalero Apache entered the region. Spanish records document nomads in the region by 1541 and some scholars have proposed an arrival as early as the 1300s, but this early date is disputed (Hawthorne 1994:14). Regardless, the Apache were nomadic hunter-gatherers and seasonally ranged into west Texas and northern Mexico. The Apaches traded with pueblos and Spanish villages but also raided these settlements. Spanish incursions into the Tularosa region were effectively limited to occasional salt treks and punitive military expeditions.

#### ***HISTORIC PERIOD (AD 1659-1950)***

In 1598, Juan de Onate claimed the Rio Grande and all its tributaries for Spain (Hammond and Rey 1966) and for the next two centuries the Spanish colonized and occupied the region. Until 1821, the Tularosa Basin was on the northern frontier of New Spain and under the Treaty of Guadalupe Hidalgo, which ended the Mexican War in 1848, New Mexico became part of the U.S. There is little evidence, however, that Spanish people occupied the Tularosa Basin before it became part of the U.S. in 1848 (Hawthorne 1994:15). The Mescalero Apache discouraged settlement of the Tularosa Basin and colonists mostly stayed near the Rio Grande.

After 1858, the U.S. Army actively pursued the Apache and by 1873 were successful in removing them to reservations. The first settlement in the area was in 1862 when several Hispanic families founded the towns of Tularosa and La Luz at the base of the Sacramento Mountains. The settlements were based on subsistence agriculture and sheep and cattle husbandry and survived periodic raids by the Apache (Hawthorne 1994:16). Beginning in the 1870s, Anglo farmers and ranchers began settling in the area. By the 1880s, ranching had become the center of the local economy and remained dominant for the next 50 years.

The El Paso and Northeastern Railroad came to the Tularosa Basin in 1898 and spurred rapid development of Alamogordo. Otero County was created the next year from portions of Doña Ana and Lincoln Counties. The U.S. federal government began affecting local affairs in 1907 with the creation of the Sacramento National Forest, later renamed the Lincoln National Forest, and in 1933, the National Park Service created White Sands National Monument (Hawthorne 1994:17). In 1942, the U.S. Army established the Alamogordo Army Air Field and the Alamogordo Bombing and Gunnery Range, which later became Holloman AFB and White Sands Missile Range. Since that time, the military presence has dominated the local economy.

#### ***SOILS***

Soils in the project area consist mostly of calcareous, Holloman-Gypsum land-Yesum complex. These are very fine sandy loams which formed in gypsiferous aeolian and alluvial sediments.

Also present are the very fine, well-drained sandy loams of the Holloman-Reeves association and the Gypsum land-Holloman complex. Both soil types are highly calcareous, having formed in gypsiferous alluvial and aeolian sediments. These soils have a high potential to contain archaeological materials in intact subsurface deposits. Moreover, the soils are fragile and are easily disturbed, causing archaeological sites in this area to be highly susceptible to damage.

#### ***RECORDS SEARCH***

A search was conducted via remote electronic terminal of the New Mexico Historic Preservation Division Archaeological Records Management System database to identify previous archaeological investigations and previously recorded archaeological sites located within the limits of the currently proposed undertaking and also located within a radius of one mile.

#### ***PREVIOUS INVESTIGATIONS IN THE IMMEDIATE VICINITY OF THE PROPOSED UNDERTAKING***

Holloman AFB, in general, and the area of the proposed undertaking in particular, have been intensively investigated by previous archaeological surveys. At least seven different inventory projects and one testing project overlap the footprint of the proposed project. These projects were all conducted in compliance with NHPA Section 106 and/or 110 and were in support of a variety of undertakings including sewage treatment facilities (Hoyt 1979), a WWTP (Sale and Peter 1993), Lake Holloman (O'Leary 1994a), a land acquisition (Tagg 1995), military training exercise (Gibbs and Sale 1995), and others. Seven of these projects occurred within a four-year period between 1992 and 1996(see Table 3.8-2).

The seven surveys were all block surveys and covered more than 3,666 acres (5.7 square miles) although the total is uncertain because New Mexico Cultural Resource Information System (NMCRIS) records do not indicate the acreage for project #78239. Not all of this acreage was on Holloman AFB; about 25 percent of the total (922 acres) was on adjacent land jurisdictions including the BLM, and the New Mexico State Land Office.

The surveys recorded a total of 43 archaeological sites including 37 newly recorded sites and five previously recorded sites. It is unknown whether any of the surveys overlapped (this seems possible), so net site density can not be accurately calculated. However, site density for individual projects ranges from a low of one site per 300 acres (NMCRIS #44027) to a high of one site per 24 acres (NMCRIS #44668), with a central tendency of roughly one site per 150-200 acres.

The single testing investigation (#54521) conducted NRHP testing on a total of 45 sites scattered across Holloman AFB, including four sites that are located within the current project limits (LA99444, LA99445, LA104257, and LA104258).

#### ***PREVIOUS INVESTIGATIONS WITHIN ONE MILE OF THE PROPOSED UNDERTAKING***

In addition to the eight previous investigations that overlap the current undertaking, an additional seven projects have been located within one mile of the current undertaking (see Table 3.8-2). These projects were all conducted in compliance with NHPA Section 106 and were in support of a variety of undertakings including borrow pits for highway construction (Koczan 1981), water quality testing drill sites (Rayl 1987), utilities installations (Rayl 1989), water line installation (White 2001), and highway construction yards (Clifton 2004).

**TABLE 3.8-2. PREVIOUS ARCHEOLOGICAL INVESTIGATIONS**

<i>NMCRIS Activity #</i>	<i>Activity Date</i>	<i>Organ- ization<sup>1</sup></i>	<i>Type of Activity</i>	<i>Acres</i>	<i>Sites</i>	<i>Reference</i>
<i>Investigations in the Immediate Vicinity of the Proposed Undertaking</i>						
37442	14 Feb 79	BLM	block survey	336	0	Hoyt 1979
44027	1 Apr 92	GMI	block survey	900	3	Sale & Peter 1993
44668	18 Oct 93	n/a	block survey	734	30	Hawthorne 1994
45380	1 Aug 93	HSR	block survey	214	2	O'Leary 1994a
45834	4 May 94	GMI	block survey	198	1	Gibbs & Sale 1995
45380	1 Aug 93	HSR	block survey	1284	5	O'Leary 1994b
54521	1 May 96	GMI	testing	n/a	45	Ernst & Barnes 1997
78239	30 Aug 95	Holloman AFB	block survey	unk.	2	Tagg 1995
<i>Investigations Conducted Within One Mile of the Proposed Undertaking</i>						
16788	22 Apr 81	NMSHTD	block survey	41.7	1	Koczan 1981
22681	4 Dec 79	n/a	linear survey	unk.	13	Camilli 1980
23412	13 Aug 87	USACE	block survey	9.9	0	Rayl 1987
24767	9 Jan 88	USACE	linear survey	26.9	0	Rayl 1989
76635	23 May 00	LMAS	testing	n/a	13	unk.
77286	9 Nov 01	WSNM	block survey	40	0	White 2001
89474	21 Jul 04	n/a	block survey	25	0	Clifton 2004

NMCRIS = New Mexico Cultural Resource Information Service; BLM = Bureau of Land Management, Las Cruces District; GMI = GeoMarine, Inc.; HSR = Human Systems Research, Inc.; AFB = Air Force Base; NMSHTD = New Mexico State Highways and Transportation Department; USACE = United States Army Corps of Engineers, Albuquerque District; LMAS = Lone Mountain Archeological Services; WSNM = National Park Service, White Sands National Monument.

The projects include four block surveys totaling 117 acres, two linear surveys of uncertain acreage, and one NRHP-eligibility testing project. The majority of the acreage surveyed was on jurisdictions other than Holloman AFB, including BLM, White Sands National Monument, New Mexico State Highways and Transportation Department, and private ownership. These surveys recorded a total of 15 sites, including 12 newly discovered sites and three previously recorded sites. The only project for which site density can be reliably calculated (#16788) yields one site per 42 acres.

The single testing investigation (#76635) conducted NRHP testing on 13 sites scattered across Holloman AFB, including one site that is located within one mile of the current project limits (LA104254).

***KNOWN ARCHEOLOGICAL SITES IN THE IMMEDIATE VICINITY OF THE PROPOSED UNDERTAKING***

Four sites are located within or immediately adjacent to the currently proposed undertaking (Table 3.8-3). All four sites date to the prehistoric period and all four were formally tested for NRHP eligibility (Ernst and Barnes 1997). As a result of testing, two of the four sites (LA99444, LA99445) have been determined by the New Mexico SHPO to be not eligible for listing on the NRHP. These two sites require no further management.

**TABLE 3.8-3. KNOWN ARCHEOLOGICAL SITES**

<i>Site Number</i>	<i>Other Number</i>	<i>Site Size</i>	<i>Time Period</i>	<i>Artifact Frequency</i>	<i>NRHP testing</i>	<i>SHPO Determination</i>
<i>Sites Located Within or Immediately Adjacent to the Proposed Undertaking</i>						
LA99444	HAR-182	83 x 38 meters	Unknown prehistoric	10s	Unk.	Not Eligible, 16 August 1993
LA99445	HAR-020	120 x 80 meters	Unknown Prehistoric	10s	2 square meters	Not Eligible, 16 August 1993
LA104257	HAR-038	104 x 34 meters	Early to late Pithouse	100s	8 square meters	Eligible, 31 October 1994
LA104258	HAR-039	120 x 80 meters	Unknown prehistoric	10s	2 square meters	Eligible, 31 Oct 1994
<i>Sites Located Within One Mile of the Proposed Undertaking</i>						
LA99446	HAR-026	30 x 10 meters	Archaic	10s	none	Undetermined, 16 August 1993
LA103426	HAR-064	28 x 14 meters	Historic Anglo	10s	unk.	Not Eligible, 21 December 1994
LA104254	HAR-035	630 x 220 meters	Paleoindian, Archaic	100s	unk.	Eligible, 31 October 1994
LA104885	HAR-083	60 x 24 meters	Jornada Mogollon	10s	2 square meters	Eligible, 17 March 1995

The other two sites (LA104257, LA104258) have been determined by the New Mexico SHPO to be eligible for listing on the NRHP under criterion D. These two sites should be avoided by the proposed undertaking. If they cannot be avoided, then any adverse effects to them resulting from the proposed undertaking must be mitigated. The specific components of a mitigation plan must be achieved in consultation with the New Mexico SHPO.

#### ***KNOWN ARCHEOLOGICAL SITES WITHIN ONE MILE OF THE PROPOSED UNDERTAKING***

Four additional sites are located within one mile of the proposed undertaking but are not within the currently defined project limits. These sites will not be directly affected by the proposed undertaking as it is currently planned, but indirect effects are possible. Such indirect effects could include increased pedestrian traffic in the vicinity leading to illegal surface collections and other forms of site vandalism.

Three of the four sites are prehistoric and one is historic Anglo. All four were formally tested for NRHP eligibility (Ernst and Barnes 1997). As a result of this testing, one site (LA103426) has been determined by the New Mexico SHPO to be not eligible for listing on the NRHP. This site requires no further management.

Two of the sites (LA104254, LA104885) have been determined by the New Mexico SHPO to be eligible for listing on the NRHP under criterion D. These two sites should be avoided by the proposed undertaking. If they can not be avoided, then any adverse effects to them resulting from the proposed undertaking must be mitigated. The specific components of a mitigation plan must be achieved in consultation with the New Mexico SHPO.

Finally, the fourth site (LA99446) is of undetermined eligibility. This site should also be avoided by the proposed undertaking. If it cannot be avoided, then it should be further investigated to assess its research potential and NRHP eligibility.

#### ***TRADITIONAL CULTURAL PROPERTIES***

Native American groups with historic ties to the area (e.g., the Mescalero Apache) and the Tigua have not identified any traditional cultural properties on Holloman AFB (Holloman AFB 1999).

### ***3.8.2.2 HISTORIC PROPERTIES***

Holloman AFB environmental staff will take the following measures to comply with the requirements of 36 CFR Part 800:

- consult with the New Mexico SHPO to establish the area of potential effects;
- identify historic-age properties within the area of potential effects;
- apply the NRHP criteria for evaluation to identified properties;
- apply the Criteria of Effect to historic properties that may be affected, and
- seek ways to avoid or mitigate adverse effects on historic properties.

## **3.9 LAND USE, RECREATION, AND VISUAL RESOURCES**

### ***3.9.1 DEFINITION OF THE RESOURCE***

Attributes of land use addressed in this analysis include general land use patterns, land ownership, and land management plans. Land use classifications include residential,



commercial, industrial, airfield, recreational, and open space. Ownership is often a primary determinant of land use. Land use is regulated by management plans, policies, and regulations, which determine the type and extent of land use allowable in specific areas and protection specially designated for environmentally sensitive areas.

Recreation resources include any opportunities for recreation and include facilities, such as swimming pools, as well as recreational opportunities that do not require facilities, such as bird watching.

Visual resources consist of the natural elements (e.g., vegetation, water bodies, mountains) and the manmade structures which typically make up the viewing environment. Visual resources are reviewed to determine the compatibility of construction projects within a surrounding environment.

The ROI for land use, recreation, visual resources consists of all the lands of Holloman AFB, as well as adjacent portions of Otero County.

### **3.9.2 EXISTING CONDITIONS**

#### **3.9.2.1 LAND USE**

Holloman AFB is located approximately 6 miles west of downtown Alamogordo, New Mexico, although one narrow extension of the Alamogordo city limit reaches along U.S. Highway 70 to three miles east of the Base. To the south and northeast of Holloman AFB, land is owned and administered by the BLM. White Sands National Monument, which is owned and managed by the National Park Service, is located to the west of Holloman AFB. The U.S. Army's White Sands Missile Range surrounds the monument and borders Holloman AFB to the north, west, and south. A combination of federal, state, and private lands are located to the east, southeast, and southwest of the base.

**Holloman AFB.** Holloman AFB owns 52,411 acres in the main Base, including a recent acquisition from the BLM in the National Defense Authorization Act of 1994 near the Lake Holloman complex in the southwestern portion of the base (Air Force 2008). Water rights are owned on an additional 7,332 acres of noncontiguous land in the Boles Wells Water System Annex and Bonito Lake located east of U.S. 54.

The Base is predominately undeveloped open space used for a variety of mission-related activities. Approximately 12.2 percent of the base is developed. The developed portions of the base include approximately 6.6 million square feet of building structures including 1,526 family housing units and 1,047 dorms. The heaviest concentration of facilities is in the south end of the Base and flanks the southern side of the airfield. Other facilities are in the north area and the west areas of the Base. The north and west areas have airfield pavement and involve a mixture of industrial, aviation-related, administrative, and community uses. The main area, or cantonment, includes a mixture of uses similar to those of a small town or city with housing, outdoor recreation, offices, and medical land uses. Within one mile north of the cantonment area is a scatter of mission, industrial, mission support, recreational, and historic facilities. Further north there are very few facilities, as the vast majority of the northern 40,000 acres of Holloman is undeveloped open space. Some open space serves as a buffer required for safety clearances, security areas, utility easements, and environmentally sensitive areas.

Jurisdiction over lands containing Lake Holloman, the Lake Holloman Lagoon G Complex, and Lagoon G were transferred from BLM to the Air Force in 1996. The transfer was made in

accordance with Section 2845 of the National Defense Authorization Act for FY 1995, Public Law 103-337 to allow for establishment of evaporation ponds that would handle effluent from the Base WWTP. The land transfer stipulates that cattle grazing allotments on portions of the land north of U.S. 70 would be disestablished but that existing rights-of-way on and public access to the land would continue. Public uses of the lands were to be “consistent with public uses on adjacent lands under the jurisdiction of the Secretary of the Interior” (BLM 2006). Camping in the area is in accordance with BLM policies.

The *Holloman General Plan* guides overall organization and development of the Base to support the mission on the installation. The General Plan defines 12 land use categories to achieve the most effective use of land and facilities. Table 3.9-1 lists and describes these categories. For the most part, existing land uses on the Base, have been developed within planning and safety criteria to be compatible with each other. These uses include safety and security restricted zones, contamination avoidance sites, and natural features such as floodplains, wetlands, and sensitive habitats.

**TABLE 3.9-1. LAND USE CATEGORIES**

<i>Land Use Category</i>	<i>Example</i>
Airfield	Runway, overruns, taxiways, aprons
Aircraft Operations and Maintenance	Hangars, maintenance shops, aircrew facilities
Industrial	Supply, civil engineering facilities, vehicle maintenance facilities
Administrative	Headquarters facilities, base support, security
Community Commercial	Base exchange, commissary, credit union, dining halls
Community Services	Schools, post office, library, chapel
Medical	Health care center, dental clinic, veterinarian facility
Accompanied Housing	Family housing, temporary housing, trailer courts
Unaccompanied Housing	Dormitories, visiting officers quarters, visiting airman quarters
Outdoor Recreation	Golf course, swimming pool, playing fields
Open Space	Conservation areas, safety clearance zones
Water	Storm drainage collection ponds

**Lands Adjacent to Holloman AFB.** To the south and northeast of Holloman AFB, land is owned and administered by the BLM and primarily leased for grazing. White Sands National Monument encompasses an area of about 145,000 acres to the southwest. The monument is administered by the National Park Service and used for recreation and preservation of special resource values (e.g., flora and fauna, geologic, visual). White Sands Missile Range surrounds the monument and borders Holloman AFB to the north, west, and south. This area is essentially undeveloped and supports a variety of military and test and development activities at specific locations and in airspace over the range.

A combination of BLM, state-owned, and private lands is located to the east, southeast, and southwest of the base. Private lands fall under the jurisdiction of Otero County. The city of Alamogordo has joint jurisdiction with the county for land use regulations for land within five miles of the city limits. Grazing is the primary use close to the base. Scattered commercial and light industrial development is found along U.S. 70 between Holloman AFB and Alamogordo. On the south side of U.S. 70, a mix of residential, commercial, and light industrial uses occurs closer to the city limits.

The Lake Holloman Lagoon G Complex is approximately 1,931 acres located north of U.S. Highway 70, with 131 acres of the total located in the southernmost portion of the Base. Holloman AFB constructed a series of berms, ditches, and control structures with cooperation from the USFWS to create a wetland area between Lake Holloman and Lagoon G. This area is open to the public and is currently used for bird watching and seasonal hunting.

Otero County includes a total of over 4.2 million acres, however, approximately 67 percent of this land area is owned by the federal government including White Sands Missile Range, Holloman AFB, BLM, White Sands National Monument, and Lincoln National Forest. By combining lands owned by the federal government with lands owned by tribal governments and state governments, the remaining private land available is only 11 percent of the total acreage in Otero County. With such a high proportion of federally-owned land around the base boundaries, and several factors limiting development on privately-owned land, encroachment by civilian development is not an issue for Holloman AFB at this time.

### **3.9.2.2 RECREATION**

Holloman AFB offers a number of recreational activities on Base including sports and other activities. Sports supported include golf, bowling, gym, tennis, swimming, camping, and horseback riding. Fishing opportunities have been intermittently available on Holloman AFB as a pond named Lance Lake located on the Apache Mesa Golf Course was opened for fishing in the summer of 2008. Other recreational facilities include an arts and crafts center, library, auto hobby, recreations center, and theater. The Base also hosts a number of events, some of which are open to members of the general public (Holloman AFB 2008a).

Lake Holloman is currently open to the public for bird watching, hiking, primitive camping, and limited waterfowl hunting. Hunting is only available in the southern portion of Lake Holloman and the western half of the constructed wetlands. Lagoon G was not part of the land transfer from BLM and therefore is off-limits for recreational use. Waterfowl hunting in Lake Holloman is restricted to Saturdays and Sundays between 0600 and 1000 (Holloman AFB 2008a). Hunters are permitted to use temporary blinds that would be removed at the end of each day. There are currently no developed or improved recreational facilities such as improved camping or developed nature trails.

Lagoon G, the northern half of Lake Holloman, and Ponds 1 and 2 in the constructed wetlands are closed to hunting to provide a refuge zone for the waterfowl. The INRMP developed by Holloman AFB in May 2008 designates this area as a Class III area with valuable ecological features because of the high biodiversity and density of birds (Holloman AFB 2008a). All hunting activities on Holloman AFB must be in accordance with state of New Mexico waterfowl hunting regulations and requires a state hunting license.

Recreational opportunities in the region immediately surrounding Holloman AFB are somewhat limited. The White Sands National Monument offers, bicycling, guided tours,

sledding, backpacking, and camping. BLM lands in the vicinity of the base are open for certain types of outdoor recreational uses. Slightly further from Holloman AFB are the cities of Alamogordo and Las Cruces, which offer several recreational opportunities.

### **3.9.2.3 VISUAL RESOURCES**

Holloman AFB is located approximately six miles west of the City of Alamogordo, which is the nearest extensively developed area. Unincorporated portions of Otero County are characterized by a mixture of large tracts of agricultural land (primarily cattle ranching) interspersed with low-density residential development and homesteads. The natural landscape is visually typical of semi-desert grasslands, with vegetation consisting primarily of shrub-scrub community dominated by creosote and mesquite. Water drainage features in the area provide some topographic variation (Air Force 2008). To the west of Holloman AFB, lies the White Sands National Monument, which contains one of the largest gypsum sand deserts in the world, and is visually quite distinctive.

Holloman AFB is visually typical of military bases. The areas on the southwest portion of the Base are primarily base housing and mission/community support facilities. Three runways and adjacent mission support facilities dominate the central portion of the Base. The northern portion of the Base is characterized by wide expanses of open space and scattered mission support facilities. Overall, approximately 88 percent of the land within the Base boundary is open space (Air Force 2008).

## **3.10 TRANSPORTATION**

### **3.10.1 DEFINITION OF THE RESOURCE**

Transportation considerations include all factors related to transportation of people and goods from one place to another. In the context of this project, only ground transportation via roads is relevant. The ROI for transportation impacts consists of Highway 70 and the Holloman AFB road network.

### **3.10.2 EXISTING CONDITIONS**

The project area is located in the southwestern portion of Holloman AFB and has direct access to public roads as well as the Base road network. U.S. 70 runs east-west immediately to the south of the project area. U.S. 70 is a 4-lane divided highway connecting Las Cruces with Alamogordo and is the primary access route between Holloman AFB and surrounding communities. Two gates provide access to the Base from Highway 70. The Main Gate is located approximately six miles west of U.S. 54. The West Gate, which is located approximately one mile west of the Main Gate along U.S. 70, serves all commercial traffic as well providing an alternative access to the Base from U.S. 70 for non-commercial traffic. The La Luz gate is located on a northeast corner of the Base and provides service for Base personnel who live in the area north of Alamogordo.

The road network on Holloman AFB is organized into arterials, collector, and local streets. Primary arterials include First Street and West Gate Avenue leading directly to and from the main cantonment gates. Other arterials include Delaware Avenue, 49er Avenue, and New Mexico Avenue. Kelly Road is classified as a collector street and provides access around the far west side of the airfield. The General Plan for Holloman AFB describes some of the most noticeable transportation issues for the base which include traffic flow issues and the need for guards to control traffic at specific locations (Holloman AFB 2008b).

Lake Holloman and Lagoon G are accessible to the public via a gravel road. This gravel road starts at U.S. 70, skirts the southeastern shore of Lake Holloman, and then turns eastward leading to Lagoon G. At the northern end of Lagoon G, the road passes through a gate in the Holloman AFB perimeter fence. The gate is typically locked and only authorized Holloman AFB personnel may pass. On the other side of the gate, the gravel road continues, passing to the west of the Holloman AFB golf course and intersecting with New Mexico Avenue. Residents of Holloman AFB generally access Lake Holloman by exiting the Base and following U.S. 70 westbound for approximately three miles to the lake's access road.

Several dirt roads and tracks exist in the project area. One dirt track circles Lake Holloman, roughly following the shoreline. Several others cross the Lake Holloman and Lagoon G Complex, providing access to the experimental tanks and other infrastructure located to the north of the wetlands area.

### **3.11 INFRASTRUCTURE**

#### **3.11.1 DEFINITION OF RESOURCE**

The infrastructure elements at Holloman AFB include the utility systems that service all areas of the Base. There are a number of utility systems on the Base that provide potable water, electricity, heating and cooling, and liquid fuels; and systems that take away wastewater and stormwater drainage. The ROI for these resources consists of Holloman AFB and the area that is supplied potable water by the City of Alamogordo.

#### **3.11.2 EXISTING CONDITIONS**

##### ***ELECTRICAL DISTRIBUTION***

Holloman AFB receives power from two separate utility companies, El Paso Electric Company and Otero County Rural Electric Cooperative. The Otero County Rural Electric Cooperative provides power to approximately one-half of the Base housing area. El Paso Electric Company provides service using a 115 kilovolt (kV) switching station located near the main gate. The El Paso Electric 115 kV line is run to three 115 kV/13.2 kV substations (Main, North, and Atlas) on the Base. The Main and North substations are currently capable of providing power to the entire Base and the overall system capacity is approximately 65 mega volt-ampere (MVA) (Holloman AFB 2008b). The current total Base system loads have a historical peak average of 21 MVA. El Paso Electric Company provides power to 324,100 customers in southern New Mexico, including Holloman AFB and the City of El Paso, Texas. In 2003, the last year of available data, El Paso Electric supplied 8,991,630 megawatt-hours of energy with a peak load of 1,546 megawatts (El Paso Electric Company 2004). Currently there are no electric utility lines established in the Lake Holloman and Lagoon G Complex.

##### ***HEATING AND COOLING SYSTEMS***

Holloman AFB provides heat and cooling to its facilities from individual systems. There is no central heating or cooling systems installed on Base. Natural gas is used primarily for space heating, incineration, hot water heaters, and small gas furnaces. PNM Gas Services is the Holloman AFB contracted local distribution company responsible for transferring the gas from the El Paso Natural Gas pipeline to the Base. The Base receives natural gas from PNM Gas Services near U.S. 54. The pipe serving the Base has a mainline pressure of 45 pounds per square inch. In the period between January 2003 and December 2003, the Base purchased 339,649 million cubic feet. On Base, the gas lines, upgraded to polyethylene lines in 1987

through 1989, are looped in a continuous system to provide service to the main area, the west area, and the north area. Currently there are no facilities in the Lake Holloman and Lagoon G Complex that require heating or cooling.

### **COMMUNICATIONS SYSTEM**

Holloman AFB has installed extensive communications connectivity and bandwidth that allows the installation to provide local telephone service, maintain a Local Area Network of one or several interconnected computer networks, connect to long-haul communication systems, and operate wireless voice (radio) networks in the local area. The Holloman AFB Communication Systems are comprised of the following subsections (Holloman AFB 2008b):

- **Information Transfer System.** This system includes the basic infrastructure conductors and pathways for the distribution of data. These pathways include copper cable, fiber optic cable, and wireless Local Area Network.
- **Telephone Switching System.** This system encompasses all required head-end equipment for the Base telephone system including the telephone switch, main distribution frame, and service providers.
- **Data Communications.** Data communications systems utilized on Base are Unclassified Network, Classified Network (SIPRNET), and the Defense Messaging System.
- **Long Haul Communications.** This system infrastructure (T-1 and T-3 lines) connects Holloman AFB to other Bases and DoD Installations.
- **Radio Systems.** This subsection includes radio frequency systems and microwave systems.
- **Flight Support Systems.** This system includes the Air Traffic Control and Landing System including radar equipment, navigational aids, meteorological systems, voice communications, and radio switching systems.
- **Video Systems.** This section includes the video editing workstations and the Video Teleconference System.

## **3.12 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE**

### **3.12.1 DEFINITION OF THE RESOURCE**

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Economic activity typically encompasses employment, personal income, and regional industries. Changes to these fundamental socioeconomic components can influence other resources such as housing availability, utility capabilities, and community services.

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Environmental Justice)*, was issued to focus the attention of federal agencies on human health and environmental conditions in minority populations and low-income populations. This EO was also established to ensure that, if there were a disproportionately high and adverse human health or environmental effects of federal actions on these populations, those effects would be identified and addressed. The environmental justice analysis addresses the characteristics of race, ethnicity, and poverty status for populations residing in areas potentially affected by implementation of the proposed action.

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks (Protection of Children)*, was issued to identify and address anticipated health or safety issues that affect children. The protection of children analysis addresses the distribution of population by age in areas potentially affected by implementation of the proposed action.

The ROI for socioeconomics and environmental justice in this analysis consists of Otero County, New Mexico.

### **3.12.2 EXISTING CONDITIONS**

#### **3.12.2.1 DEMOGRAPHICS**

In 2006, the estimated population of Otero County was over 62,700 persons, of which the City of Alamogordo comprises 57 percent of the population in the county. Between 2000 and 2006, the population of the City of Alamogordo and Otero County grew at a slower rate than the state of New Mexico. During that time, the City of Alamogordo grew at an average annual rate of 0.2 percent, while Otero County grew at an average annual rate of 0.1 percent (Table 3.12-1).

**TABLE 3.12-1. POPULATION IN OTERO COUNTY AND THE CITY OF ALAMOGORDO**

	2000	2006	<i>Average Annual Change, 2000-2006</i>
City of Alamogordo	35,582	36,069	0.2%
Otero County	62,298	62,744	0.1%
New Mexico	1,819,046	1,954,599	1.2%

Source: U.S. Census Bureau 2008a, 2008b

Holloman AFB has a total of 4,148 active duty military assigned to the Base, including active duty personnel with the German Air Force. Dependents of the active duty military number a total of 4,583 persons. An additional 1,136 appropriated fund civilian personnel are employed at Holloman AFB. Military retirees in the local area number approximately 6,700 persons. With other civilian positions and contractor positions, the total population associated with Holloman AFB is 17,394 (Holloman AFB 2008c). Assuming that all of these individuals reside in Otero County, the Base-related population directly comprises nearly 28 percent of the 2006 population in the county.

#### **3.12.2.2 ECONOMIC ACTIVITY**

Employment steadily increased between 2001 and 2006 in Otero County and the state of New Mexico. The total number of jobs in Otero County in 2001 was over 26,700 jobs (U.S. Bureau of Economic Analysis 2008a). By 2006, total employment was over 29,100 jobs representing an average annual increase of 1.7 percent between 2001 and 2006. The state of New Mexico experienced a higher rate of employment growth during the same time period with total employment in 2006 of nearly 1.1 million with an average annual increase of 2.4 percent (Table 3.12-2).

**TABLE 3.12-2. EMPLOYMENT GROWTH, 2001-2006**

	2001	2006	<i>Average Annual Change, 2000-2006</i>
Otero County	26,775	29,106	1.7%
New Mexico	977,815	1,099,401	2.4%

Source: U.S. Bureau of Economic Analysis 2008a



Government and government enterprise comprise the largest share of total employment in Otero County accounting for over 36 percent of total employment (Table 3.12-3) (U.S. Bureau of Economic Analysis 2008a). The military sub-industry of the government and government enterprises accounted for nearly 13 percent of total employment while state and local employment accounted for nearly 17 percent. The second-largest industry in terms of employment was the Retail Trade industry comprising over 10 percent of total employment.

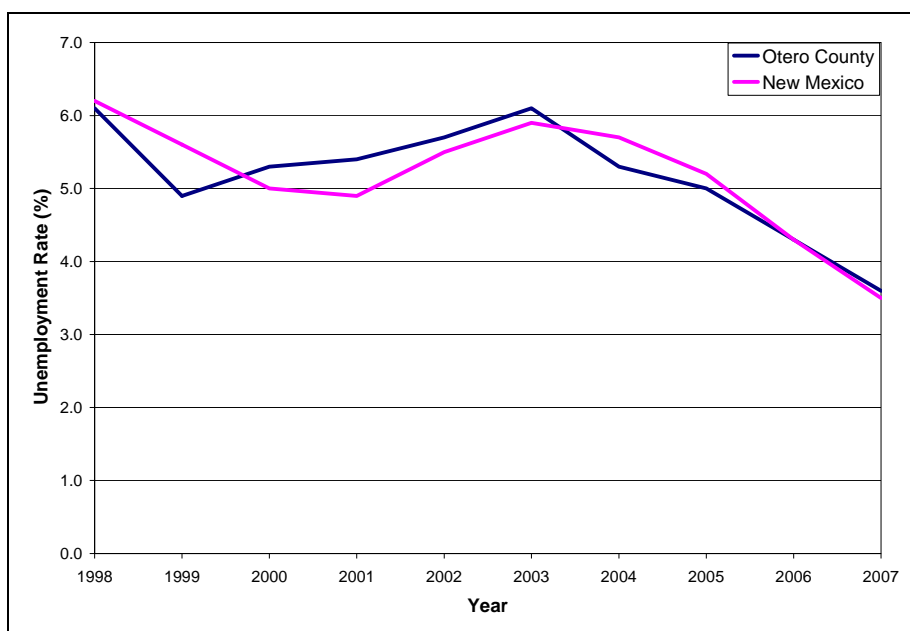
**TABLE 3.12-3. EMPLOYMENT BY INDUSTRY SECTOR, OTERO COUNTY, 2006**

	<i>Number of Jobs</i>	<i>Share of Total Employment</i>
Total employment	29,106	100.0%
Farm employment	629	2.2%
Forestry, fishing, related activities, and other	201	0.7%
Mining	66	0.2%
Utilities	73	0.3%
Construction	2,070	7.1%
Manufacturing	323	1.1%
Wholesale trade	310	1.1%
Retail Trade	2,998	10.3%
Transportation and warehousing	847	2.9%
Information	295	1.0%
Finance and insurance	630	2.2%
Real estate and rental and leasing	1,036	3.6%
Professional and technical services	1,150	4.0%
Management of companies and enterprises	59	0.2%
Administrative and waste services	1,434	4.9%
Educational services	154	0.5%
Health care and social assistance	2,670	9.2%
Arts, entertainment, and recreation	306	1.1%
Accommodation and food services	1,810	6.2%
Other services, except public administration	1,390	4.8%
Government and government enterprises	10,655	36.6%
Federal, civilian	2,007	6.9%
Military	3,718	12.8%
State and local	4,930	16.9%

Source: U.S. Bureau of Economic Analysis 2008a

Unemployment rates in Otero County and the state of New Mexico were consistent with each for most of the time between 1998 and 2007. In 2007, the unemployment rate in Otero County was at the lowest levels in nearly 10 years at 3.6 percent (U.S. Bureau of Labor Statistics 2008).

The state of New Mexico also reached its lowest unemployment rate in that time frame with an unemployment rate of 3.5 percent. The highest unemployment rate for Otero County was in 1998 and 2003 at 6.1 percent while in New Mexico it was 6.2 percent, also in 1998 (Figure 3.12-1).



Source: U.S. Bureau of Labor Statistics 2008

**FIGURE 3.12-1. UNEMPLOYMENT RATES, 1998-2007**

In 2006, Otero County had a lower per capita income than the state of New Mexico. Otero County had a per capita income of \$22,798, compared to the state per capita income of \$24,132 (U.S. Bureau of Economic Analysis 2008b). Otero County and the state had comparable annual growth rates between 2001 and 2006 with an average annual increase of 4.5 percent and 4.4 percent, respectively (Table 3.12-4).

**TABLE 3.12-4. PER CAPITA INCOME, 2001-2006**

	2001	2006	Average Annual Change, 2001-2006
Otero County	\$18,277	\$22,798	4.5%
New Mexico	\$24,132	\$29,929	4.4%

Source: U.S. Bureau of Economic Analysis 2008b

As with per capita income, average earnings per job in Otero County in 2006 were also lower than average earnings per job in New Mexico. Average earnings in Otero County were \$35,922 in 2006 and \$38,239 in New Mexico.

Government and government enterprises account for more than half of the total earnings in Otero County in 2006. This industry comprises over 60 percent of the total earnings in Otero County with nearly \$630 million in earnings out of the total \$1 billion for the county (U.S. Bureau of Economic Analysis 2008b). The military sub-industry has nearly \$300 million in earnings and comprises approximately 30 percent of the county's total earnings. State and local government and federal civilian accounts for approximately 18 percent and 14 percent of total earnings, respectively (Table 3.12-5).

**TABLE 3.12-5. EARNINGS BY INDUSTRY SECTOR, OTERO COUNTY, 2006**

	<i>Earnings (\$000)</i>	<i>Total Share of Earnings</i>
Total Earnings	\$1,045,541	100.0%
Farm Earnings	\$2,573	0.2%
Forestry, fishing, related activities, and other	\$3,352	0.3%
Mining	\$1,996	0.2%
Utilities	\$5,100	0.5%
Construction	\$58,187	5.6%
Manufacturing	\$7,768	0.7%
Wholesale trade	\$6,939	0.7%
Retail Trade	\$60,832	5.8%
Transportation and warehousing	\$31,679	3.0%
Information	\$11,178	1.1%
Finance and insurance	\$18,267	1.7%
Real estate and rental and leasing	\$8,061	0.8%
Professional and technical services	\$36,657	3.5%
Management of companies and enterprises	\$1,468	0.1%
Administrative and waste services	\$29,847	2.9%
Educational services	\$2,177	0.2%
Health care and social assistance	\$81,420	7.8%
Arts, entertainment, and recreation	\$2,781	0.3%
Accommodation and food services	\$22,942	2.2%
Other services, except public administration	\$23,383	2.2%
Government and government enterprises	\$628,934	60.2%
Federal, civilian	\$143,204	13.7%
Military	\$299,510	28.6%
State and local	\$186,220	17.8%

Source: U.S. Bureau of Economic Analysis 2008b

Holloman AFB estimates that the total economic impact of the installation and the assigned personnel in FY 2007 is over \$482 million within a 50-mile radius of the installation (Holloman AFB 2008c). The Base creates approximately 6,111 jobs from a combination of the active duty and civilians employed at the Base and an additional 2,047 indirect jobs are also created in the community from the military personnel and their families. Contracts and procurements from Holloman AFB provide approximately \$74.3 million in government expenditures in the local area. With additional expenditures from the health care, tuition assistance and impact aid for public schools and universities, and temporary billeting in the local community, the total annual government expenditures in the community as a result of Holloman AFB are over \$102 million.

### 3.13 ENVIRONMENTAL JUSTICE

For the purpose of the environmental justice analysis, minority and low-income populations and the population of children are defined as:

- *Minority Populations:* All persons identified by the Census of Population and Housing to be of Hispanic or Latino origin, regardless of race, plus non-Hispanic persons who are Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other (i.e., non-white) Race or Two or More Races.
- *Low-Income Populations:* All persons who fall within the statistical poverty thresholds published by the U.S. Census Bureau in the Current Population Survey are considered to be low-income. For the purposes of this analysis, low-income populations are defined as persons living below the poverty level (\$16,895 for a family of four with two children, adjusted based on household size and number of children), as reported in the 2000 Census. The percentage of low-income persons is calculated as the percentage of all persons for whom the Census Bureau determines poverty status, which is generally a slightly lower number than the total population since it excludes institutionalized persons, persons in military group quarters and college dormitories, and unrelated individuals under 15 years old.
- *Children:* All persons identified by the Census of Population and Housing to be under the age of 18 years.

Based on 2000 Census data, the population of Otero County and the state of New Mexico is almost evenly divided between white and minority populations with the share of minority persons in New Mexico accounting for over 55 percent of the total population. In Otero County, minority persons comprise over 44 percent of the total population. The share of the population in Otero County under the age of 18 is comparable to that of the youth population in New Mexico with 29.5 percent in the county as compared to 28.0 percent in the state. The share of the population in Otero County below the established poverty level was 19.3 percent as compared to 18.4 percent in New Mexico (Table 3.13-1).

**TABLE 3.13-1. POPULATIONS OF CONCERN**

	<i>Population</i>	MINORITY PERSONS		PERSONS BELOW POVERTY		CHILDREN UNDER 18	
		<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
New Mexico	1,819,046	1,005,551	55.3	328,933	18.4	508,574	28.0
Otero County	62,298	27,598	44.3	11,737	19.3	18,352	29.5
City of Alamogordo	35,582	15,012	42.2	5,771	16.5	10,196	28.7

Source: U.S. Census Bureau 2000

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## 4.0 ENVIRONMENTAL CONSEQUENCES

### 4.1 NOISE

Noise impacts have been assessed for noise generated by the project itself (facility construction and day-to-day activities) as well as noise generated by other sources that could potentially impact proposed activities in the project area.

#### 4.1.1 PROPOSED ACTION

**Construction.** The Proposed Action includes several construction/improvement projects, some of which would be expected to involve heavy equipment. Heavy equipment types that may be used in these projects are listed in Table 4.1-1 along with typical maximum ( $L_{max}$ ) noise levels associated with each equipment type.

**TABLE 4.1-1. TYPICAL EQUIPMENT SOUND LEVELS**

<i>Equipment</i>	SOUND LEVEL ( $L_{max}$ IN dBA) AT INDICATED DISTANCE FROM EQUIPMENT	
	<i>100 feet</i>	<i>500 feet</i>
Dozer	75.6	61.7
Dump Truck	70.4	56.5
Drum Mixer	74.0	60.0
Backhoe	71.5	57.6
Generator	74.6	60.6

Source: Federal Highway Administration 2006

Construction would increase noise levels in and near project areas over a period of several years. Construction of individual components of the Proposed Action would occur as funding becomes available. As a result, noise would occur intermittently, lasting for the duration of individual component projects. In the long-term, buildings and other facilities would require periodic maintenance to avoid corrosion and other forms of degradation. Maintenance would generate noise (e.g., paint sprayer, power washer, vehicles), but would not typically require use of heavy construction equipment, as listed in Table 4.1-1. Noise impacts would be localized to the area immediately surrounding the maintenance activities. Corrosion may be accelerated by the presence of Lake Holloman, which has a high salt content. High rates of corrosion would require more frequent maintenance activities. These areas are only occasionally used by humans, and no recreating humans would be expected to be near construction sites while construction is being carried out. Construction noise is qualitatively different from the aircraft that is common in the ROI under baseline conditions. Wildlife may flee the area while construction activity is under way.

**Day-to-Day Activities.** Day-to-day activities at Lake Holloman would include picnicking, boating, fishing, and primitive camping. Noise associated with day-to-day activities may temporarily disturb wildlife activities, such as bird nesting. To the extent practicable, walking paths, camping areas, and other new infrastructure would be sited such that areas used by nesting birds would be avoided.



Noise generated during ATV recreation would have the potential to annoy other humans in the area and disturb wildlife. However, the state of New Mexico prohibits operation of ATV's that produce greater than 96 dB (New Mexico Administrative Code 18.15.3), greatly reducing the potential for impacts. ATV use would be restricted to existing roadways and monitored to ensure that this restriction is obeyed. Roadways in the Lake Holloman and Lagoon G Complex are currently utilized by an unknown number of motorized vehicles, likely consisting primarily of pickup trucks and other ruggedly-built vehicles. The frequency of use of these roadways may increase somewhat under the Proposed Action. ATV noise may be considered annoying by other users of the Lake Holloman Recreational Area, but noise produced by ATV's would not be expected to preclude any of the other proposed recreational activities. Noise and vibration generated by ATV's may also be disturbing to wildlife, particularly birds during nesting season. Typical responses of wildlife to passing vehicular traffic may include fleeing or hiding from the noise. The incremental addition of vehicular noise along existing roads could potentially modify nearby habitat such that it would be less conducive to wildlife foraging and nesting/breeding. If special status species were to be exposed to these incremental effects, the noise could potentially be construed as harassment, as defined under the ESA. However, individuals of special status species are currently exposed to aircraft noise and vehicular noise and would be expected to habituate to increased frequency of road use. So long as restrictions on ATV use are enforced, as described in Chapter 2.0 of this EA and the Holloman AFB INRMP, impacts to species would be expected to be limited to infrequent behavioral responses. Additional information on ATV noise impacts on wildlife can be found in Section 4.6, *Biological Resources*. These impacts could be further reduced by imposing seasonal restrictions for ATV or other recreational uses during wildlife breeding seasons.

**Effects of Aircraft Noise on Proposed Activities.** Aircraft noise may have a minor, negative impact on recreational activities proposed to occur at Lake Holloman and Lagoon G. Air Force land use recommendations state that outdoor recreation (including water recreation) is fully compatible with aircraft noise levels of less than 70 dB DNL and conditionally compatible with noise levels of 70 to 79 dB DNL. "Group Camps" are considered to be conditionally compatible between 65 and 75 dB DNL (Air Force 1999). As noted in Section 3.1, aircraft noise levels in the Lake Holloman area range from less than 65 dB DNL to approximately 79 dB DNL and noise levels at Lagoon G range between 75 and 79 dB DNL. In situations where compatibility is marginal, Air Force regulations indicate that "additional evaluation is warranted."

Boating, picnicking, bird watching, and fishing activities could potentially be momentarily disrupted by aircraft overflights. Camping, in particular, could be problematic on nights when Holloman AFB is flying late-night missions (Finegold *et al.* 1994, Federal Interagency Committee on Aviation Noise 1997). Noise impacts on recreational activities resulting from aircraft overflights would be limited to annoyance.

#### **4.1.2 ALTERNATIVE A**

Noise impacts under Alternative A, would be the same as those discussed for the Proposed Action. Construction noise impacts would be temporary and no humans would be expected to be affected. Proposed recreational activities that benefit from a quiet environment (camping, bird watching, and hiking) may be slightly negatively impacted by aircraft noise. ATV noise may be considered annoying by other users of the Lake Holloman Recreational Area, but noise produced by ATV's would not be expected to preclude any of the other proposed recreational activities. ATV noise may also be disturbing to wildlife, particularly birds during nesting

season. ATV impacts would be the same under the Proposed Action and Alternative A. Again, seasonal restrictions during wildlife breeding seasons could reduce these impacts.

### **4.1.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, the improvements to the water recreation area would not be implemented. No construction would be carried out. Low-intensity activities (e.g., limited camping and other recreation) would continue to occur at Lake Holloman and the noise environment would remain as it is currently.

## **4.2 SAFETY**

### **4.2.1 PROPOSED ACTION**

**Ground Safety.** Short-term safety risks associated with facility construction could occur, but standard safety practices would minimize any potential risks. In order to assure the safety of the public and Air Force personnel utilizing the Lake Holloman complex, emergency communication, and a visitor check-in station should be provided. Additionally, a fishing educational program should be implemented. Also, additional signage should be provided to educate the patrons of potential dangers they may encounter while on-site. Mandatory briefings for safe operation of watercraft and the required use of personal flotation devices should minimize risks associated with watercraft use.

The clay soils in the area are extremely slippery during and after rain events. Vehicle incidents and accidents have been experienced due to this condition. Improved road surfaces, gravel, and mulch will aid in improving the situation, but the soil will become more susceptible to erosion with increased foot and vehicle traffic and more potentially slick surfaces will result.

ATVs would be permitted in accordance with safety requirements established by New Mexico state laws as well as the Holloman AFB Safety office. ATV users must be trained, certified, and supervised by base personnel. ATV use would be restricted to existing roads in areas that can sustain their use without damage to natural or cultural resources. Signs would be posted to notify ATV riders of these restricted areas. Prior to the allowance of ATV use in the Lake Holloman or Lagoon G area, Holloman AFB Natural Resources personnel would thoroughly evaluate each resource base, particularly soils and wildlife. Protective equipment and designated safety apparel would be required for all ATV and OHV operators. Other restrictions to ATV use from the assessment by Holloman AFB Natural Resources personnel would be incorporated into an updated INRMP. ATV's will also be required to comply with New Mexico's Off-Highway Motor Vehicle Act (State of New Mexico 2009).

The use of campfires within the recreational area has the potential to increase the risk of wildland fires on Holloman AFB. As a result, restrictions on campfires will be strictly enforced and will be communicated to all campers through the use of brochures, signs, etc. Campfires will not be allowed during high, very high, or extreme fire danger. All visitors building campfires will be required to keep at least five gallons of water and a shovel on site and all fires will be required to be less than three feet in height and diameter. Guidelines for campfires and fire ring construction and maintenance will be approved by the Holloman AFB CES/CEF, Fire Department. All campfire rings must have at least a ten-foot radius area free of combustible material, and branches overhead must be cleared at least ten feet above the ring. Fires must be attended at all times, and all fires must be completely extinguished, using water, prior to leaving the campsite.

In addition, the use of ATV's has the potential to increase wildland fire risk due to potential sparks from catalytic converters. In order to mitigate this risk, all ATV's will be required to have spark arrestors. Base fire and rescue, augmented by local responders, will continue to respond to accidents or other safety-related incidents in the Lake Holloman area. Security and local law enforcement personnel will continue to patrol the recreational areas and increase their presence as needed.

**Flight Safety.** Construction of the new recreational complex would not require any waivers from UFC 3-260-01, which identifies areas that must be kept clear to maintain flight safety. No adverse impacts have been identified from the implementation of the Proposed Action.

**Explosive Safety.** The Lake Holloman Recreational Area could be located within an explosive safety zone, should commercial traffic be relocated to a new gate and road complex near the site. This zone, typically referred to as quantity-distance, is based on the types and amounts of explosives stored at a location. Should this occur, established explosive safety standards and criteria will require re-siting of some or all of the Lake Holloman project.

#### **4.2.2 ALTERNATIVE A**

Safety impacts under Alternative A would be the same as those discussed for the Proposed Action.

#### **4.2.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, the improvements to the water recreation area would not be implemented.

### **4.3 AIR QUALITY**

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 250 tons per year or more emissions for that specific pollutant and does not exceed 10 percent of the total ROI's emissions for each pollutant as compared to the ROI's 2002 NEI data. The 250 tons per year criterion approach is used in the USEPA's New Source Review (NSR) standards as an indicator for impact analysis for listed new major stationary emissions sources (such as a chemical process plant) in attainment areas for PSD, while the 10 percent criterion approach is used in the USEPA's General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. Although the ROI is an attainment area, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions.

The Air Conformity Applicability Model (ACAM) version 4.3.0 was utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed federal actions in areas designated as nonattainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. ACAM was utilized to provide emissions for construction, grading, and paving activities by providing user inputs for each; details are discussed in Appendix B, Air Quality. Commuter emissions were calculated based on personnel increases, which were input into ACAM. The ACAM calculations were augmented by emission calculations of munitions, tactical, watercraft, and aircraft emissions completed in Microsoft Excel.

Calculated air emissions were compared to the established 250 tons per year PSD criterion and, using the General Conformity Rule, were also compared to the appropriate county (Otero County) as represented in the 2002 NEI to identify impacts. The air quality analysis focused on emissions associated with the demolition and relocation activities. Air quality issues associated with operational activities at Holloman AFB after the completion of the project are not included in this evaluation. It is assumed that once demolition, relocation, or salvage is completed, air quality would return to baseline levels.

#### **4.3.1 PROPOSED ACTION**

The Proposed Action would construct various recreational facilities around Lake Holloman such as a group event pavilion, boat rental facility, restroom facility, both primitive and improved camping areas, and three miles of nature trails. These actions would require land clearing and construction.

**Construction Emissions.** Emissions during the construction period were quantified to determine the potential impacts on regional air quality. The emission factors for building construction include contributions from engine exhaust emissions (i.e., construction equipment, material handling, and workers' travel) and fugitive dust emissions (e.g., from grading activities). Demolition emissions (from removal of old pavement) include fugitive dust and transport of demolition debris offsite. Site preparation and grading emissions include fugitive dust from ground disturbance, plus combustive emissions from heavy equipment operating during the construction period. Paving emissions include combustive emissions from bulldozers, rollers, and paving equipment, plus emissions from a dump truck hauling pavement materials to the site. Estimated emissions that would occur from construction, grading, and paving activities under the Proposed Action are presented in Table 4.3-1. The emissions shown would occur over the duration of the construction period.

**TABLE 4.3-1. CONSTRUCTION EMISSIONS – PROPOSED ACTION**

<i>Emission Activities</i>	EMISSIONS (TONS/YEAR)				
	<i>CO</i>	<i>NO<sub>x</sub></i>	<i>PM<sub>10</sub></i>	<i>SO<sub>2</sub></i>	<i>VOC</i>
Construction Emissions	3.25	1.06	17.23	0.13	0.26
Point Source	0.02	0.02	0.00	0.00	0.00
Mobile Source	0.00	0.00	0.00	0.00	0.00
Total	3.27	1.08	17.23	0.13	0.26
Otero County Emissions	16,943.66	2,307.66	115,775.80	145.89	2,290.55
Percentage of County Emissions	0.02%	0.05%	0.01%	0.09%	0.01%

CO = carbon monoxide; VOC = volatile organic compound; NO<sub>x</sub> = nitrogen oxides; SO<sub>x</sub> = sulfur oxides; PM<sub>10</sub> = particulate matter less than or equal to 10 micrometers in diameter; PM<sub>2.5</sub> = particulate matter less than or equal to 2.5 micrometers in diameter

Emissions generated by construction and paving projects are temporary in nature and would end when construction is complete. Particulate matter would have the greatest emission at 17.23 tons per year but would cause only a 0.01 percent increase to the county PM<sub>10</sub> emissions.

SO<sub>2</sub> would have the greatest impact to regional air quality with a 0.09 percent increase. All emissions would be less than the 250 tons per year threshold and all would make up less than 0.1 percent of Otero County emissions.

The emissions from fugitive dust (PM<sub>10</sub>) would be considerably less than those presented in Table 4.3-1 with the implementation of control measures in accordance with standard construction practices. For instance, frequent spraying of water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of ground cover or pavement are standard landscaping procedures that could be used to minimize the amount of dust generated during construction. Using efficient practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. Vehicular combustion emissions from construction worker commuting may be reduced by carpooling.

In general, combustive and fugitive dust emissions would produce localized, short-term elevated air pollutant concentrations, which would not result in any long-term impacts on the regional air quality.

#### **4.3.2 ALTERNATIVE A**

Alternative A would have the same emissions as described under the Proposed Action. No adverse impacts are expected to regional air quality.

#### **4.3.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, no construction emissions would occur and operational emissions would be identical to current baseline.

### **4.4 EARTH RESOURCES**

#### **4.4.1 PROPOSED ACTION**

As a result of the Proposed Action, up to approximately three acres of ground surface would be temporarily disturbed as a result of construction of the camping areas, nature trails, and other facilities. There would be a net increase of impervious surface consisting of approximately 5,780 SF of net building footprint upon completion of the Proposed Action.

Activities within the Proposed Action associated with construction would occur on either the Holloman-Gypsum Land Yesum complex or the Mead Silty Clay Loam. These soil mapping units are considered to have limitations in regard to the construction of small buildings and road construction, providing an indication that there may be a high level of maintenance needed on these sites. The grading of existing soil and placement of structural fill for the new facilities would not substantially alter existing soil conditions around Lake Holloman because all of the construction would occur on land areas with little slope and most construction sites will be leveled with gravel or crushed aggregate and asphalt.

Earthmoving to construct several small facilities, installation of utilities, and road maintenance would excavate soils, temporarily removing vegetation and exposing them to wind and water erosion. However, the clay soils in the area are extremely slippery during and after rain events. Vehicle incidents and accidents have been experienced due to this condition. Improved road surfaces, gravel, and mulch will aid in improving the situation, but the soil will become more susceptible to erosion with increased foot, ATV, and vehicle traffic and more potentially slick

surfaces will result. In general, accelerated erosion can be minimized for planned construction and maintenance projects by siting and designing facilities to take into account soil limitations, employing construction and stabilization techniques appropriate for the soils and climate, and implementing temporary and permanent erosion control measures. While soils would be changed by earthmoving activities, the effects would be localized and would not result in significant indirect impacts on water resources because Best Management Practices (BMPs), erosion and sediment controls, and stormwater management measures would be implemented. Compliance with the requirements of the NPDES Construction General Permit would be required if the area disturbed at any one time totals one acre or more. The BMPs used to stabilize the soils for erosion and sediment control would also minimize soil loss from wind erosion by ensuring that temporary measures protect the soil surface. This would serve to minimize adverse air quality impacts from blowing soil particles.

The Lake Holloman and Lagoon G Complex is an area typical of the Tularosa Basin and consists of playas and alluvial deposits. Therefore, potential impacts to earth resources as a result of the Proposed Action would be minimal.

#### **4.4.2 ALTERNATIVE A**

Under Alternative A, the effects from the construction of improvements and recreation facilities at Lake Holloman would be the same as those described under the Proposed Action.

#### **4.4.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, no construction would occur and no new impacts to earth resources would occur at Lake Holloman. Conditions would remain as described in Section 3.1.2.

### **4.5 PHYSICAL RESOURCES**

#### **4.5.1 PROPOSED ACTION**

##### **4.5.1.1 HAZARDOUS MATERIALS AND WASTE**

Construction and demolition accomplished as part of the Proposed Action may require the use of hazardous materials by contractor personnel. In accordance with AFI 32-7086, *Hazardous Materials Management*, the 355 CEAO Hazardous Material Manager and the HMMP Team manage issues and requests associated with hazardous materials on Holloman AFB. In accordance with the Base's *Hazardous Materials Management Plan*, copies of Material Safety Data Sheets must be provided to the Base and maintained on the construction site. The Base would maintain any hazardous materials used by Base personnel in the operation of the complex and no adverse environmental consequences are anticipated. Project contractors would comply with federal, state, and local environmental laws and would employ affirmative procurement practices when economically and technically feasible. Water quality testing and analysis of fish tissue in Lagoon G would be required to determine the type of fishing allowed (catch and release or keep). An existing boat ramp at Lagoon G may need to be re-graded. Sediment sampling, if required, should confirm presence/absence of PCB's or other contaminants if required by the State. PCB and other contaminants such as heavy metals would be confined to the sediment.

Contractor personnel may generate hazardous waste, such as paints, adhesives, and batteries during construction of the recreation area. Storage and disposal of these wastes would be the



responsibility of the site contractor and will be coordinated with the Base's hazardous waste program personnel. Any hazardous waste generated by facilities covered by this EA during everyday or special event operations will be handled by Holloman AFB Hazardous Waste Managers in accordance with the Holloman AFB *Hazardous Waste Management Plan*. No adverse environmental consequences are expected.

#### **4.5.1.2 SOLID WASTE**

Under the Proposed Action, there is no requirement for demolition of facilities. Therefore, the only sources of solid waste would be from construction debris and the ongoing operation of the recreational area. All construction debris would be discarded in accordance with Holloman AFB *Solid Waste Management Plan*. Garbage and recycling receptacles would be placed at the new facilities for the group pavilion and camping sites. Garbage and recycling would be collected in accordance with the Holloman AFB *Solid Waste Management Plan*. Garbage would be collected and disposed in the Lincoln/Otero County landfill.

#### **4.5.2 ALTERNATIVE A**

##### **4.5.2.1 HAZARDOUS MATERIALS AND WASTE**

Under Alternative A, the effects from the construction of improvements and recreation facilities at Lake Holloman would be the same as those described under the Proposed Action. Coordination with the Holloman AFB Hazardous Waste Managers would be carried out prior to any site preparation or construction to ensure that any necessary waivers, manifests, approvals and/or permits are in place.

##### **4.5.2.2 SOLID WASTE**

The effects of the construction projects and improvements associated with Alternative A would have the same effect as described in the Proposed Action. Solid waste would be generated from construction debris and from the operation of the recreation area. All solid waste would be disposed of or recycled in accordance with Holloman AFB *Solid Waste Management Plan*.

#### **4.5.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, the improvements to the water recreation area would not be implemented.

### **4.6 BIOLOGICAL RESOURCES**

Determination of the significance of impacts to biological resources is based upon: 1) the importance (legal, commercial, recreational, ecological, or scientific) of the resource, 2) the rarity of a species or habitat regionally, 3) the sensitivity of the resource to proposed activities, 4) the proportion of the resource that would be affected relative to its occurrence in the region, and 5) the duration of the impact. Impacts to biological resources are considered to be greater if priority species or habitats are adversely affected over relatively large areas and/or disturbances cause reductions in population size or distribution of a priority species.

#### **4.6.1 PROPOSED ACTION**

##### **4.6.1.1 VEGETATION**

Effects to vegetation from construction activities would be expected to be minor due to the small percentage of total vegetative resources on the Base being disturbed. Construction of

recreational facilities at Lake Holloman will result in a loss of approximately 135,680 SF (three acres) of vegetation along the southeastern portion of the lake. Vegetation lost will primarily be fourwing saltbush and pickleweed shrublands. In addition, approximately 48,000 SF (1.1 acres) of fourwing saltbush and pickleweed shrublands will be lost due to the construction of nature trails on government-owned property around Lake Holloman. Nature trails would not be developed in wetlands or on private property which is located on the west side of Lake Holloman.

The ground-disturbing activities and the removal of vegetation during construction will expose the soil and make it vulnerable to runoff, especially in areas that have an existing slope. This could potentially affect the water quality of Lake Holloman (see Section 3.7, Water Quality). Erosion control BMPs such as silt fences, drainage swales, sediment traps, subsurface drains, level spreaders, sediment basins, and infiltration trenches will be implemented throughout the construction period. Techniques for rapid stabilization of disturbed areas include seeding, mulching, geotextiles, sod stabilization, and vegetative buffer strips. Only native species will be used for reseeded. In addition, native trees may be planted within the recreational areas to provide shade.

#### **4.6.1.2 NOXIOUS WEEDS**

Indirect effects on neighboring plant communities could occur if invasive species became established and spread from areas disturbed by construction. Construction projects that involve land disturbance increase the chance of spreading non-native invasive species. Currently, there are four invasive non-native species present within the project area: tamarisk, African rue, fivehorn smotherweed, and Russian thistle. It is especially important to ensure that construction and operations of the recreational facilities does not contribute to the spread of these species. There is also the potential for new invasive species to infest the site. These sources could arrive from contaminated construction fill, seed and erosion-control products, and residue on equipment brought in from other areas.

Holloman AFB will adhere to BMPs such as those listed below in order to significantly decrease the opportunity for new species to invade and existing species to spread.

- Prior to ground-disturbing activities, all invasive species should be treated and/or removed from the construction site using the appropriate and most effective species- and site-specific techniques such as herbicide application and mechanical removal.
- Projects should begin in non-infested areas first.
- Wash all machinery of mud, dirt, and plant material prior to entering and exiting the site.
- Reestablish vegetation on all bare ground and use native plant species when possible for stabilizing disturbed areas and landscaping at the project sites.
- Inspect all erosion control material (e.g., hay bales) for presence of invasive species prior to installation.
- Provide training to workers and management on the identification of invasive species and the importance of weed control.
- Monitor site closely for presence of invasive species following construction.
- Include language in construction contracts to help prevent the spread of weeds.

#### **4.6.1.3 WILDLIFE**

The Lake Holloman and Lagoon G Complex provides important seasonal and year round nesting and foraging habitat for a variety of wetland species, most notable migrating and resident bird populations. Currently, public access and recreational activities such as bird watching are allowed within the Lake Holloman and Lagoon G Complex. However, recreational activities from the Proposed Action will increase the level of activity. An increase in human activity and noise from the proposed recreation, as well as an increase in noise from construction, has the potential to affect wildlife resources within the Lake Holloman and Lagoon G Complex. In order to minimize effects on these species, construction activities will be limited to the non-breeding season. Signs and kiosks will also be posted along the boundaries of known nesting areas to notify visitors of prohibited areas and educate them on the importance of the wildlife habitat and the ways to minimize effects on the species.

ATV use would only be permitted on existing roads outside of wetlands and sensitive wildlife areas. Signs will be posted on the boundaries of designated ATV roads to notify ATV operators of prohibited areas.

Effects on terrestrial wildlife surrounding the project area would be minimal; however, an increase in human activity from the construction and use of the nature trails may dissuade wildlife use of that area.

#### **4.6.1.4 THREATENED AND ENDANGERED SPECIES**

The Lake Holloman and Lagoon G Complex provides important seasonal and year-round foraging and nesting habitat for at least two federally-listed species and five state-listed species: the northern aplomado falcon, interior least tern, peregrine falcon, western snowy plover, white-faced ibis, northern harrier, and the mountain plover. Currently, public access and recreational activities such as bird watching are allowed within the Lake Holloman and Lagoon G Complex. However, recreational activities from the Proposed Action will increase the level of activity. Noise and human presence from the proposed construction and recreational activities have the potential to have an effect on these species, especially during nesting season. The western snowy plover, a former federal Category 2 species and currently a federal species of concern, in particular, has the potential to be affected. It is commonly observed and has been known to nest within the mudflats, dry salt flats, and playas of the Lake Holloman and Lagoon G Complex, and most commonly within Stinky Playa. The other four species are either rarely observed in the project area, and/or have not been observed nesting within the area. In order to minimize effects on these species, construction activities will be limited to the non-breeding season. Signs and kiosks will also be posted along the boundaries of known nesting areas to notify visitors and ATV operators of prohibited areas and educate them on the importance of the wildlife habitat and the ways to minimize impacts on the species.

A Cooperative Agreement for protection of the state-listed threatened White Sands pupfish was signed on July 21, 1994 by the Air Force and Army as well as other federal and state agencies. This Cooperative Agreement is formulated to delineate an effective and cooperative working relationship between its signatories in protecting and maintaining viable populations of the White Sands pupfish in its natural habitats on White Sands Missile Range, Holloman AFB, and White Sands National Monument. The Proposed Action would not impact the protective measures and agency responsibilities outlined in this plan.

Threatened and endangered species are likely to be affected, but not likely to be adversely affected by the construction and operation of the recreational area that would be developed under the Proposed Action.

#### **4.6.1.5 WETLANDS**

Prior to the start of the project, a wetland delineation per the USACE methods will need to be conducted to determine the jurisdictional status of the wetlands on the site. If a jurisdictional wetland is delineated within the project area, a Section 404 permit may be required for any discharge of fill material into jurisdictional wetlands at Holloman AFB.

Effects to wetlands are expected to be minimal. No construction activities will be located within any of the wetlands. However, construction activities will be located along the edge of Lake Holloman and Stinky Playa and the ground-disturbing activities and the removal of vegetation during construction will expose the soil and make it vulnerable to runoff, especially in areas that have an existing slope. Effects will be minimized through the use of erosion control BMPs such as silt fences, drainage swales, sediment traps, subsurface drains, level spreaders, sediment basins, and infiltration trenches will be implemented throughout the construction period. Techniques for rapid stabilization of disturbed areas include seeding, mulching, geotextiles, sod stabilization, and vegetative buffer strips. Only native species will be used for reseeding. In addition, native trees may be planted within the recreational areas to provide shade.

Currently, public access and recreational activities such as bird watching are allowed within the Lake Holloman and Lagoon G Complex. Recreational activities from the Proposed Action will increase the level of activity; however, this will have minimal impacts to the wetlands. ATV usage would be permitted on existing roads only and would not be permitted in wetlands or sensitive wildlife areas. Signs will be posted to notify ATV riders of restricted wetland and wildlife areas. Maintenance activities associated with the roads and recreational facilities will use BMPs to minimize further sedimentation and erosion into the wetland areas. Signs prohibiting entrance into the wetland areas, and asking visitors to stay on designated trails and roads will be posted.

#### **4.6.2 ALTERNATIVE A**

Impacts to biological resources from Alternative A would be similar to those of the Proposed Action. However, there would be a slight decrease in activity in Lagoon G as fishing would not be permitted. This could increase potential disturbance to wildlife and sensitive species using the constructed wetlands and Lagoon G.

#### **4.6.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, there would be no ground disturbing activities or changes in recreational status and thus no impacts to biological resources at Holloman AFB would occur. Conditions would remain as described in Section 3.6.

### **4.7 WATER RESOURCES**

Land development changes the physical, chemical, and biological conditions of water resources. When land is developed, the hydrology, or the natural cycle of water, can be altered. Impacts on hydrology can result from land clearing activities, disruption of the soil profile, loss of vegetation, introduction of pollutants, new impervious surfaces, and an increased rate or

volume of runoff after major storm events. Without proper management controls, these actions can adversely impact the quality and/or quantity of water resources.

Criteria for evaluating impacts related to water resources associated with the Proposed Action are water availability, water quality, and adherence to applicable regulations. Impacts are measured by the potential to reduce water availability to existing users, endanger public health or safety by creating or worsening health hazards or safety conditions, or violate laws or regulations adopted to protect or manage water resources. An impact to water resources would be significant if it would: 1) reduce water availability to or interfere with the supply of existing users; 2) create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or 5) violate established laws or regulations that have been adopted to protect or manage water resources of an area. Impacts of flood hazards on proposed actions can be significant if such actions are proposed in areas with high probabilities of flooding; however, these impacts can be mitigated through the use of specific design features to minimize the effects of flooding.

Increases in impervious surfaces act to increase peak discharge volume and speed delivery of water to nearby waterways, which ultimately increases the potential for flooding as well as the transport of pollutants to surface waters. In undeveloped land, rainfall is collected and stored in vegetation, in the soil column, or in topographic depressions. Water is then utilized by plants and respired, or it moves slowly into groundwater and/or eventually to waterbodies where it slowly moves through the hydrologic cycle. Removal of vegetation and/or soil compaction decreases infiltration into the soil column and thereby increases the quantity and timing of runoff. Replacement of vegetation with an impervious surface, such as concrete, eliminates any potential for infiltration and also speeds up delivery of the water to nearby drainage channels. With less storage capacity in the soil column and vegetation, urban streams rise more quickly during storm events and have higher peak discharge rates, both of which increase the potential for flooding downstream and damage to public infrastructure and private property.

#### **4.7.1 PROPOSED ACTION**

With regard to water resources, the primary concerns associated with the Proposed Action include changes to surface water drainage; water quality impacts related to construction activities, wildlife habitat, aquatic life, and secondary contact; and groundwater recharge.

##### ***SURFACE WATER***

As a result of the Proposed Action, there would be an overall increase of 5,780 SF of impervious surface upon completion of the Proposed Action. This slight increase in surface water runoff as a result of the Proposed Action would be managed through the implementation of appropriate permit-related BMPs which would prevent erosion, control sediment loss, and keep other pollutants from running off site.

A Notice of Intent with the USEPA would be filed to obtain coverage under a construction general permit prior to implementation of individual construction projects for any change in the quality or quantity of wastewater discharge and/or stormwater runoff from construction sites where one or more acres would be disturbed. Implementation of the Proposed Action may require an SWPPP showing how the implementation of appropriate BMPs would prevent erosion, control sediment loss, and keep other pollutants from running off site as a result of

construction. Such BMPs would include the use of well-maintained silt fences or straw wattles, minimizing surficial area disturbed, stabilization of cut/fill slopes, minimization of earth-moving activities during wet weather, covering of soil stockpiles, use of secondary containment for the temporary storage of hazardous liquids, and establishment of buffer areas near intermittent streams, as appropriate. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and native seed mixtures, and managed to minimize future erosion potential. Additionally, within 30 days after completion of construction, a Notice of Termination would be filed with the USEPA.

### **GROUNDWATER**

The proposed facilities would increase the amount of impervious surface area by 5,780 SF resulting in an increase in the amount of surface runoff and consequent potential decrease in groundwater recharge. Surface water runoff as a result of the proposed construction would be attenuated through the use of permit-related temporary and/or permanent drainage management features such as detention/retention basins and BMPs. The integration of water harvesting and open natural space into the design of the proposed sites such that discharge exiting each site post-construction would be equal to or less than existing conditions further minimizes potential adverse impacts associated with surface water runoff.

### **WATER QUALITY**

As stated in Section 3.7, preliminary analysis of existing water quality data for Lake Holloman suggest that water quality standards for wildlife habitat, aquatic life, and secondary contact are met, though *E.coli* samples suggest that primary contact standards are not. However, since water quality data is still preliminary, and much is incomplete and still awaiting analysis, any decision as to the use of Lake Holloman for secondary contact boating will be determined by the State of New Mexico upon completion of their testing and analysis. Currently, there are no recent water quality data for Lagoon G. Therefore, in order to designate this area for secondary contact activities such as fishing and boating, water quality data would need to be taken and analyzed by the NMED before these activities are approved. However, Lagoon G supports a population of mosquito fish and the water quality of the effluent discharged from the WWTP is monitored per the NPDES permit. The water quality of the effluent currently meets all applicable discharge standards.

During construction activities, exposed soils are vulnerable to runoff, making it necessary to take measures to minimize soil erosion. An increase in sediments can impair fish respiration, reduce plant productivity and water depth, and smother aquatic organisms (Ohrel and Register 2006). However, with proper BMPs in place, affects on water quality from the construction activities are expected to be temporary and localized.

Another concern for construction sites is the potential for construction debris and waste to be picked up by stormwater runoff and transported to adjacent waters. To minimize the potential for impacts to water quality, construction site waste materials, hazardous wastes, and sanitary wastes that are generated on site would be handled and disposed of in accordance with state and local requirements. To minimize the risk of spills or accidental releases of waste or hazardous materials, construction operations would comply with the Holloman AFB Spill Prevention, Control, and Countermeasure Plan.

Impacts to water quality from increased recreational activities would be minimal. Boating would be restricted to non motorized or electric powered boats, and therefore the risk of spill or

leakage from engines would be negated. Sewage from bathroom facilities and RVs would be disposed of in compliance with federal, state, and local regulations and would not affect the water quality of the lake. Trash receptacles will be located throughout the recreational facilities and routine cleanup by Base personnel or contractors would take place around and within the lake. Stormwater runoff from parking and camping facilities could potentially increase pollutants from entering the lake system. However, given one of the primary purposes of the lake is to receive stormwater runoff from the Base, the Proposed Action is not likely to differ significantly from No Action.

Water quality monitoring of Lake Holloman and Lagoon G would continue, as prescribed by the State of New Mexico, in order to assure that it meets state standards for designated uses. Specifically, the Lake Holloman and Lagoon G Complex would be monitored on a regular basis during peak recreational times in the summer for harmful algae blooms. Recreational activities would be discontinued in the case of harmful algae blooms or significant changes in water quality.

### **FLOODPLAINS**

EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The Proposed Action will avoid any development to the extent practicable within floodplains associated with the Holloman Lake, Lagoon G, and Stinky Playa hydrologic system.

#### **4.7.2 ALTERNATIVE A**

Effects on water quality from Alternative A would be similar to those of the Proposed Action. Under this alternative, Lagoon G would not be available for fishing; however, the NMED would need to conduct additional water quality testing at Lagoon G to verify that water quality is sufficient to support secondary activities, primarily boating.

#### **4.7.3 No Action Alternative**

Under the No Action Alternative, there would be no ground disturbing activities or changes in recreational status and thus no impacts to water quality at Holloman AFB would occur. Conditions would remain as described in Section 3.7.

## **4.8 CULTURAL RESOURCES**

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing.

Analysis of potential impacts to cultural resources considers direct impacts that may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting



the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts generally result from increased use of an area.

For all build alternatives, Section 106 consultation will be completed prior to initiating construction. In the event of the unexpected discovery of an archaeological site, all ground-disturbing project activities will cease until environmental staff can determine whether or not the materials warrant further actions under NAGPRA, Archeological Resources Protection Act, or the NHPA.

#### **4.8.1      *PROPOSED ACTION***

Four archaeological sites are located within one mile of the proposed undertaking but are not within the currently defined project limits. These sites will not be directly affected by the proposed undertaking as it is currently planned, but indirect effects are possible. Such indirect effects could include increased pedestrian traffic in the vicinity leading to illegal surface collections and other forms of site vandalism. No non-archaeological historic resources have previously been identified in the project vicinity.

#### **4.8.2      *ALTERNATIVE A***

Impacts to cultural resources would be the same under Alternative A as under the Proposed Action.

#### **4.8.3      *NO ACTION ALTERNATIVE***

Under the No Action Alternative, Lake Holloman Recreational Area would not be further developed. There would be no impacts to cultural resources under this alternative.

### **4.9      LAND USE, RECREATION, AND VISUAL RESOURCES**

#### **4.9.1      *PROPOSED ACTION***

##### **4.9.1.1    *LAND USE***

It is not anticipated that the proposed construction of additional facilities and improvements in the Lake Holloman and Lagoon G Complex would result in impacts to either on-base or off-base land uses. Land in the project area would remain under the jurisdiction of Holloman AFB, and land uses would continue to be in accordance with Section 2845 of Public Law 103-337 (BLM 2006). Prior to construction, a land ownership survey and property records search would be conducted on any lands on which construction would occur. The development of the water recreation area would have a minor beneficial effect on the current land use at Lake Holloman by expanding the availability of recreational opportunities.

##### **4.9.1.2    *RECREATION***

Implementation of the Proposed Action would improve recreation at Holloman AFB. Under the Proposed Action, Lake Holloman and Lagoon G would support fishing, group events, and non-motorized boating. Lake Holloman would continue to support waterfowl hunting. Fishing would be available at Lagoon G either seasonally or year-round. There is an existing boat ramp at Lagoon G that may need to be re-graded. Hunting at Lake Holloman would be restricted due to potential safety concerns related to the increased number of visitors. Hunting regulations would be in accordance with state regulations and the Holloman AFB Safety office as outlined

in the Holloman AFB INRMP. Camping opportunities at Lake Holloman would be improved with the addition of established campsites with amenities such as picnic tables and tent pads. Nature trails would allow for improved nature viewing opportunities around Lake Holloman. Non-motorized boats would be permitted in Lake Holloman and Lagoon G if the NMED approves the water quality at each site for secondary contact (Section 4.7).

ATV use would be permitted on designated roads outside of the wetlands and sensitive wildlife areas. ATV users must be trained, certified, and under supervision to use the area. ATV use would be restricted to existing roads in areas that can sustain their use without damage to natural or cultural resources. Seasonal restrictions would be implemented to minimize effects of ATV use on nesting or breeding wildlife. Signs would be posted to notify ATV riders of these restricted areas. Prior to the allowance of ATV use in the Lake Holloman or Lagoon G area, Holloman AFB Natural Resources personnel would thoroughly evaluate each resource base, particularly soils and wildlife. Other restrictions to ATV use from the assessment by Holloman AFB Natural Resources personnel would be incorporated into an updated INRMP.

#### **4.9.1.3 VISUAL RESOURCES**

Visual resources would be improved by the construction and improvements proposed. The Proposed Action would improve the accessibility of Lake Holloman to military members and the general public without disrupting the natural setting of Lake Holloman. Construction and improvements for the recreational area would not be within wetlands or sensitive wildlife areas.

#### **4.9.2 ALTERNATIVE A**

Effects on land use, recreation, and visual resources under Alternative A would be very similar to those under the Proposed Action. Land use resources would be improved under Alternative A as Lake Holloman and Lagoon G are improved as a recreational area. The expanded activities and facilities would be the same as those discussed in the Proposed Action; however, fishing would not be permitted in Lagoon G or Lake Holloman. In all other respects, the impacts of the Proposed Action and Alternative A on these three resource areas would be the same.

#### **4.9.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, there would be no improvement projects or construction projects conducted at Lake Holloman or Lagoon G. These areas would still be open to military members and the general public for the current recreational activities, such as bird watching. However, boating and fishing would not be available in these areas. Primitive camping, waterfowl hunting, bird watching, and hiking would be permitted; however, there would be no facilities or improvements such as improved trails or camping sites to support these activities.

### **4.10 TRANSPORTATION**

#### **4.10.1 PROPOSED ACTION**

Under the Proposed Action, development of recreational activities at Lake Holloman would be expected to result in increases to the number of people visiting the lake. Several of the gravel roads within the project area would be upgraded to provide improved accessibility. Upgrades would consist of addition of crushed concrete and grading. In addition, parking areas within the project area are being improved through the addition of crushed concrete. These improvements are expected to provide sufficient access to accommodate increased visitors to Lake Holloman. Residents of Holloman AFB would continue to access Lake Holloman via U.S. 70. Overall, transportation in the ROI would improve slightly under the Proposed Action.

#### **4.10.2 ALTERNATIVE A**

Impacts to transportation would be the same under Alternative A as under the Proposed Action. Under Alternative A, roads and parking lots would also be improved to accommodate increased numbers of visitors to Lake Holloman.

#### **4.10.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, no construction would take place. Holloman AFB would continue to carry out regular maintenance on existing roads.

### **4.11 INFRASTRUCTURE**

#### **4.11.1 PROPOSED ACTION**

There would be no impacts anticipated to Holloman AFB infrastructure under the Proposed Action. The recreational facilities that would be constructed would require minimal infrastructure to be installed. Electric distribution and telephone lines would need to be installed to the recreation area and around Lake Holloman as needed. These lines would be incorporated into the same system as Holloman AFB and service would be provided by the current utility providers. The boat rental facility may require a cooling system, however, that would be installed on the individual facility and would not require additional infrastructure from the main Base. Natural gas lines would not need to be extended into the area.

#### **4.11.2 ALTERNATIVE A**

Any changes to infrastructure under Alternative A would be very similar to the changes required as described in the Proposed Action. Electric distribution and telephone lines would need to be installed at Lake Holloman and Lagoon G as required. Service to these lines would be provided by the current utility providers and would be part of the overall utility infrastructure at Holloman AFB. Natural gas lines would not need to be extended into either Lake Holloman or Lagoon G. A cooling system may be required for the boat rental facility, however, this would be installed as part of the individual facility and would not be dependent on other systems at Holloman AFB.

#### **4.11.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, there would be no additional infrastructure requirements at Lake Holloman. There would be no facilities to connect to electricity, water, or other utilities. Base infrastructure would remain the same as described in the existing conditions.

### **4.12 SOCIOECONOMICS**

#### **4.12.1 PROPOSED ACTION**

Under the Proposed Action, Holloman AFB would develop a water recreation area around Lake Holloman to provide picnicking, fishing, and other water recreation opportunities to Holloman AFB personnel and dependents. Improvements to the lakeside area would involve construction of a covered picnic area including barbecue grills, improved boat ramps and a facility for renting boats, and several other more isolated areas for picnicking or RVs.

Construction and long-term maintenance expenditures for the Proposed Action have not been determined at this time because there is the potential that the project could be funded jointly by Holloman AFB and the City of Alamogordo. However, the construction expenditures would have a temporary beneficial effect on the local economy. The additional expenditures would

create jobs, primarily in the construction sector, for the term of the construction projects. Given the limited magnitude and duration of the construction projects, it is unlikely that construction workers would migrate to the area from outside of the county or the state. Therefore, the construction expenditures would provide additional employment and income to local workers.

Additional benefits would be from the proposed boat rentals. However, these boat rentals would be an extension of the current boat rentals provided by the Services flight at Holloman AFB. Any fees associated with the boat rentals would provide revenues for the Services flight.

#### **4.12.2 ALTERNATIVE A**

The economic benefits of Alternative A would be the same as those discussed under the Proposed Action. There would be a temporary beneficial effect on the local economy from the construction expenditures that would only last for the term of the project. Also, the Services flight at Holloman AFB would benefit from revenues gained while operating a boat rental facility at the water recreation area.

#### **4.12.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, the improvements to the water recreation area would not be implemented. The local economy would continue as described in the existing conditions. Military members and their dependents would travel to other areas to take advantage of any water recreation activities.

### **4.13 ENVIRONMENTAL JUSTICE**

#### **4.13.1 PROPOSED ACTION**

The Proposed Action is not expected to create significantly adverse environmental or health impacts. Consequently, no disproportionately high and adverse human health or environmental impacts to minority and/or low-income populations have been identified. In addition, there are no known environmental health risks associated with the Proposed Action that may disproportionately affect children. There would be an overall beneficial effect with the availability of a local water recreation area and the associated recreation activities.

The construction areas would be restricted, to effectively bar any person, including children, from unauthorized access. The Proposed Action would provide additional recreational opportunities to all minorities and/or low-income populations as well as children. However, additional safety procedures as described in Section 3.2 and 4.2, Safety, would contribute to ensuring a safe environment, particularly for children.

#### **4.13.2 ALTERNATIVE A**

As described under the Proposed Action, there are no known environmental health risks associated with Alternative A that would affect children and no disproportionate or adverse impacts to minority and/or low-income populations are expected. There would be a beneficial effect as the opportunities for water recreation would be expanded in the local area. Additional safety procedures as described in Section 3.2 and 4.2, Safety, would contribute to ensuring a safe environment, particularly for children.

#### **4.13.3 NO ACTION ALTERNATIVE**

Under the No Action Alternative, the improvements to the water recreation area would not be implemented.

## **5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

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### **5.1 CUMULATIVE EFFECTS**

This section provides (1) a definition of cumulative effects, (2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, (3) an assessment of the nature of interaction of the Proposed Action and alternatives with other actions, and (4) an evaluation of cumulative effects potentially resulting from these interactions.

#### **5.1.1 DEFINITION OF CUMULATIVE EFFECTS**

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7). Recent CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action and alternatives. The scope must consider geographic and temporal overlaps and must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a proposed action and alternatives and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA analysis addresses three questions:

1. Does a relationship exist such that elements of the proposed action might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the proposed action in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the Proposed Action.

### **5.1.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS**

This EA applies a stepped approach to provide decision makers with not only the cumulative effects of the Proposed Action but also the incremental contribution of past, present, and reasonably foreseeable actions.

#### **5.1.2.1 PAST ACTIONS RELEVANT TO THE PROPOSED ACTION AND ALTERNATIVES**

Holloman AFB is an active military installation that undergoes continuous change in mission and training requirements. This process of change is consistent with the U.S. defense policy that must be ready to respond to threats to American interests throughout the world. In the past eight years, two force structure changes have occurred at Holloman AFB.

#### **5.1.2.2 PRESENT ACTIONS RELEVANT TO THE PROPOSED ACTION AND ALTERNATIVES**

Holloman AFB, like any other major institution, also requires occasional new construction, facility improvements, and infrastructure upgrades. Holloman AFB has begun receiving two squadrons of F-22A aircraft.

#### **5.1.2.3 REASONABLY FORESEEABLE ACTIONS THAT INTERACT WITH THE PROPOSED ACTION AND ALTERNATIVES**

This category of actions includes Air Force actions that have a potential to coincide, either partially in time or geographic extent, with the Proposed Action. Information on these actions is included to determine whether these actions would, if implemented, incrementally affect environmental resources. These recently proposed actions include:

- Holloman AFB is transforming from F-117A aircraft to the F-22A aircraft. As a result, 50 F-117A and associated 14 T-38A trainer aircraft will eventually be replaced with two squadrons of F-22A aircraft. Each F-22A squadron consists of 18 primary assigned aircraft and two backup aircraft inventory. With the retirement of the F-117A and supporting T-38A aircraft, Holloman AFB has the capabilities and facilities to support the operational F-22A aircraft in meeting national defense objectives. This transformation would occur over a period of approximately 3 to 5 years and require a total of 26 renovation, construction, or infrastructure improvement projects with a total cost of \$37 million. New additions and buildings on 4 acres of previously disturbed land add approximately 37,600 square feet of constructed space at Holloman AFB. Assigned personnel changes and associated revisions in maintenance would reduce total personnel assigned to or working at Holloman AFB by an estimated 321 positions.
- Holloman AFB is evaluating a proposal to construct a supplemental irrigation source for the Base golf course. The proposal would substitute use of potable water that is currently utilized for irrigation with treated effluent from Holloman AFB's WWTP. The golf course at Holloman AFB is currently irrigated with approximately 70 million gallons per year of potable water.
- Relocation of the existing Commercial Truck Gate is being considered for Holloman AFB. One alternative would construct a new access point two miles west of the existing commercial vehicle gate. This alternative would require the construction of a new roadway designed for commercial vehicles as well as a security post and inspection area

and would traverse the area proposed for development in this EA. The project is currently in the preliminary EA phase.

- The 49<sup>th</sup> Materiel Maintenance Group proposes to upgrade the area known as the Basic Expeditionary Airfield Resources Base to meet upcoming mission requirements. Upgrades include expanding warehouse storage space, improving existing outdoor storage space, and consolidating training, mobility, storage, and maintenance facilities. The facility is located away from the Lake Holloman area and will not impact the Lake Holloman proposal.
- Holloman AFB is being considered as a site for the establishment of two Unmanned Aerial System (UAS) squadrons and one UAS training squadron. If chosen for this mission, permanent support facilities would need to be established. Once a decision is made, an environmental analysis of the Proposed Action would be completed.

### **5.1.3 ANALYSIS OF CUMULATIVE EFFECTS**

The following analysis examines how the impacts of the actions presented above might be affected by those resulting from the Proposed Action and No Action Alternative at Holloman AFB, and whether such a relationship would result in potentially significant impacts not identified when the Proposed Action or alternatives are considered individually.

**Noise.** Construction noise emanating off-site as a result of the Proposed Action and the activities described in Section 5.1.2 would probably be noticeable in the immediate site vicinity, but would not be expected to create adverse impacts. Replacement of the F-117A and T-38 aircraft with the F-22A squadrons would incrementally increase average noise levels in the immediate vicinity of Lake Holloman. This is not expected to adversely affect wildlife in the area because they already exist in a qualitatively similar noise environment involving regular takeoffs, landings, and overflight by military jet aircraft and would be expected to habituate to the changes associated with transformation to the F-22A aircraft. Therefore, the acoustic environment on and near Holloman AFB is expected to remain relatively unchanged from existing conditions. Cumulative impacts from noise are expected to be minimal.

**Safety.** Short-term safety risks associated with the facility construction proposed in the Proposed Action as well as the projects included in Section 5.1.2 could occur. Strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these construction activities. Fishing, boating, and ATV educational programs will be implemented to minimize risks associated with these recreational activities. Cumulative impacts to safety are expected to be minimal.

**Air Quality.** In general, combustive and fugitive dust emissions from proposed Lake Holloman and Lagoon G Recreation Area construction activities, as well as those activities described in Section 5.1.2, would produce localized, elevated air pollutant concentrations that would occur for a short duration and would not result in any long-term impacts on the air quality of Otero County. Cumulative impacts to air quality in the county are expected to be minimal.

**Earth Resources.** In addition to the proposed development of the Lake Holloman and Lagoon G Recreational Area, an additional amount of surface disturbance could result from recently completed, on-going, and future construction at Holloman AFB. The grading of existing soil and placement of structural fill for new facilities would not substantially alter existing soil



conditions at Holloman AFB. BMPs would be used to limit soil movement, stabilize runoff, and control sedimentation. Cumulative impacts to earth resources are not expected to occur.

**Physical Resources.** The proposed construction of the Lake Holloman Recreational Area, as well as those projects described in Section 5.1.2, would generate construction waste that would be recycled and/or taken to the local landfill, as appropriate. There are no capacity issues with the existing landfills. Hazardous materials and wastes would be handled, stored, and disposed of in accordance with applicable regulations. If the contractor encounters contamination, they would stop work and contact Holloman AFB. Any ACM, lead-based paint, or contaminated soils associated with ERP sites would be removed and disposed of per applicable regulations. Cumulative impacts to physical resources are expected to be minimal.

**Biological Resources.** Effects to vegetation from construction activities associated with the development of the Lake Holloman Recreational Area, as well as the actions described in Section 5.1.2, would be expected to be minor due to the small percentage of total vegetative resources on Holloman AFB being disturbed. Erosion control BMPs such as silt fences, drainage swales, sediment traps, subsurface drains, level spreaders, sediment basins, and infiltration trenches will be implemented throughout the construction period. Seeding, mulching, geotextiles, sod stabilization, and vegetative buffer strips would be used for rapid stabilization using only native species. Construction activities would not occur within designated wetlands. The project may affect, but is not likely to adversely affect, endangered or threatened species that may be present in the project area. However, implementation of seasonal restrictions of posting sensitive habitat areas will ameliorate potential impacts. Therefore, cumulative impacts to biological resources are expected to be minimal.

**Water Resources.** Construction activities associated with the proposed Lake Holloman Recreational Area development and the projects discussed in Section 5.1.2 would result in an increase in surface water runoff which could be managed through implementation of appropriate permit-related BMPs which would prevent erosion, control sediment loss, and keep other pollutants from running offsite. Proper grading of roadways away from water bodies will minimize run-off into Lake Holloman, Lagoon G, or other waterways.

**Cultural Resources.** Activities associated with the development of the Lake Holloman Recreation Area and the projects described in Section 5.1.2 are not expected to impact archaeological or cultural resources. All construction will be coordinated with the Holloman AFB Cultural Resource Manager and the SHPO. Impacts to traditional cultural resources are not expected. In the event of an incidental discovery, construction activities will cease and the Holloman AFB Cultural Resources Manager will be notified. Cumulative impacts to cultural resources are expected to be minimal.

**Land Use, Recreation, and Visual Resources.** The construction activities and proposed development of the Lake Holloman Recreation Area, as well as the projects described in Section 5.1.2, are expected to enhance Holloman AFB's current recreation opportunities and enhance Holloman AFB's planning and compatibility of functions. Land use off base is not expected to be impacted. Visual resources are generally not expected to be impacted. Cumulative impacts to land use, recreation, and visual resources is expected to be minimal.

**Transportation.** The proposed development of the Lake Holloman Recreation Area is expected to improve the accessibility of the recreation area to Holloman AFB personnel and the general public. Traffic is expected to increase as more recreation activities become available. The

projects included in Section 5.1.2 have the potential to affect the existing traffic flow on Holloman AFB; however, it is not expected that the base transportation infrastructure is adequate to accommodate any changes in personnel or traffic flows. Cumulative impacts are expected to be minimal.

***Infrastructure.*** The proposed development of the Lake Holloman Recreation Area and the projects included in Section 5.1.2 would have the potential to result in a minor hindrance in transportation and circulation during the construction period. In general, infrastructure would improve at Holloman AFB under these actions as services are expanded into the Lake Holloman and Lagoon G Complex and as existing infrastructure is upgraded. Cumulative impacts are expected to be minimal.

***Socioeconomics.*** There is the potential for long-term changes in the Holloman AFB population and/or employment as new missions, such as new UAS squadrons, are beddown at Holloman AFB. The resulting change in employment would have an indirect beneficial effect on the local region by generating indirect employment and potential increase in incomes. The construction activities as a result of the proposed Lake Holloman Recreation Area and other projects included in Section 5.1.2 would have a temporary beneficial effect by generating additional construction employment. However, this employment would be short-term and would end when construction is complete. Cumulative impacts are expected to be minimal.

***Environmental Justice.*** The proposed development of the Lake Holloman Recreation Area and the projects listed in Section 5.1.2 are not expected to disproportionately impact minority or low-income populations. These projects are not expected to generate adverse health effects. Children under the age of 18 are also not likely to be affected. Access to construction sites would be restricted and base development would be confined within base boundaries.

The No Action Alternative represents status quo conditions and would not represent any change from the existing environment.

No specific projects have been identified that would produce incremental impacts when added to other past, present, or reasonably feasible future actions. Holloman AFB is an active military installation that undergoes changes in mission and training requirements in response to defense policies, current threats, and tactical and technological advances. The Base, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. All of these factors (i.e., mission changes, facility improvements, and tenant use) will continue to occur before, during, and after the Proposed Action, if it is selected. The Base actions described in Section 5.2.2.3 affect very specific areas on Base and, for the most part, the scope of the actions is focused. None of these on-Base actions would be expected to result in more than negligible impacts individually or cumulatively. Coordination between this proposal and the Commercial Gate proposal must occur in order to minimize impacts to either project.

## **5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

NEPA requires that environmental analysis include identification of “...any irreversible and irretrievable commitments of resources; which would be involved in the proposed action should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resource and the effects that the uses of these resources have on future

generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For the Proposed Action, most resource commitments are neither irreversible nor irretrievable. Those limited resources that may involve a possible irreversible or irretrievable commitment under the Proposed Action are discussed below.

Flight and other Base operations would continue and involve consumption of nonrenewable resources, such as gasoline and diesel used in vehicles. None of these activities would be expected to significantly decrease the availability of minerals or petroleum resources.

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---

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**APPENDIX A**  
**INTERAGENCY AND INTERGOVERNMENTAL**  
**COORDINATION FOR ENVIRONMENTAL PLANNING**





**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS 49TH FIGHTER WING (ACC)  
HOLLOMAN AIR FORCE BASE, NEW MEXICO

OCT 29 2008

49 CES/CEA  
550 Tabosa Avenue  
Holloman AFB, NM 88330-8458

Bill Burt  
Committee of Fifty  
8 Ridge Lane  
Alamogordo NM 88310

SUBJECT: Environmental Assessment for Lake Holloman Recreation Area Development

The United States Air Force is in the process of preparing an Environmental Assessment (EA) to assess the potential environmental impacts of a proposal to construct a water recreation area surrounding Lake Holloman located on Holloman Air Force Base (AFB), New Mexico. The environmental analysis for the proposed action, one alternative, and a No Action alternative is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969.

The proposed action would consist of the development of approximately three acres on the southeastern portion of Lake Holloman for recreational facilities, such as a group pavilion, boat rental facility, restrooms, camping areas, and a beach area. Approximately three miles of nature trails would also be developed and existing roads and parking areas would be improved. The development of Lake Holloman would support recreational opportunities such as boating, swimming, hunting, and fishing for Holloman AFB personnel and the surrounding community. In addition to the proposed action, an alternative would be analyzed in the EA, as well as the No Action alternative. Attached are two maps that provide an overview of the project area.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you within 30 days from the date of this letter.

Your comments will be incorporated into the Draft Environmental Assessment which will be released for a 30-day public review comment period. Two weeks following the end of this comment review period, a public information meeting will be held in Alamogordo, New Mexico.

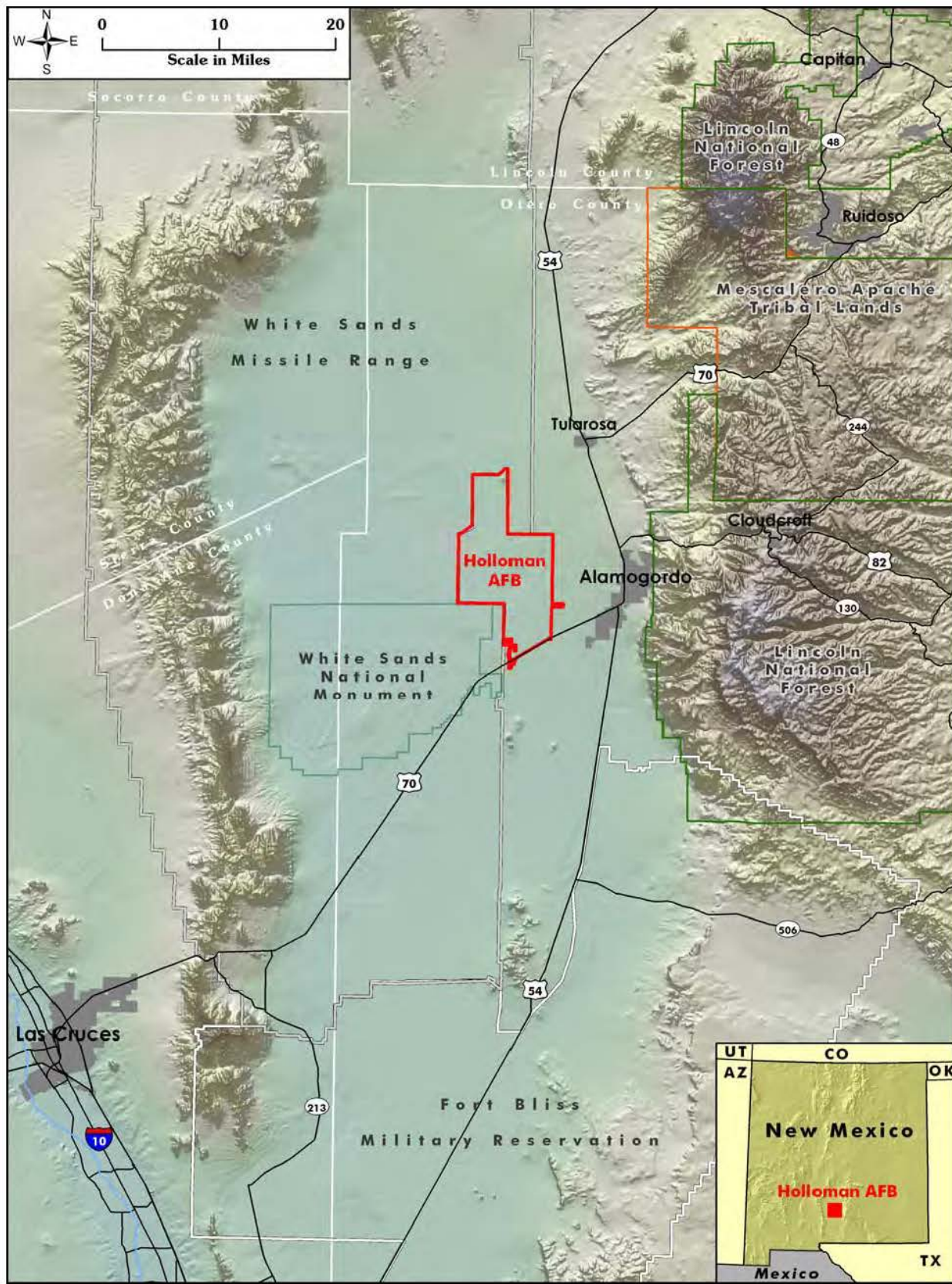
Please contact Mr. Wesley J. Westphal with 49 CES/CEAO at (575) 572-6678 with any concerns that you or your staff may have. Please forward your written comments to Mr. Wesley J. Westphal, 49 CES/CEAO, 550 Tabosa Avenue, Holloman AFB NM 88330-8458. Thank you for your assistance.

A handwritten signature in black ink, appearing to read 'A. Budak', is positioned above the printed name.

A. DAVID BUDAK  
Deputy Base Civil Engineer

Attachment:

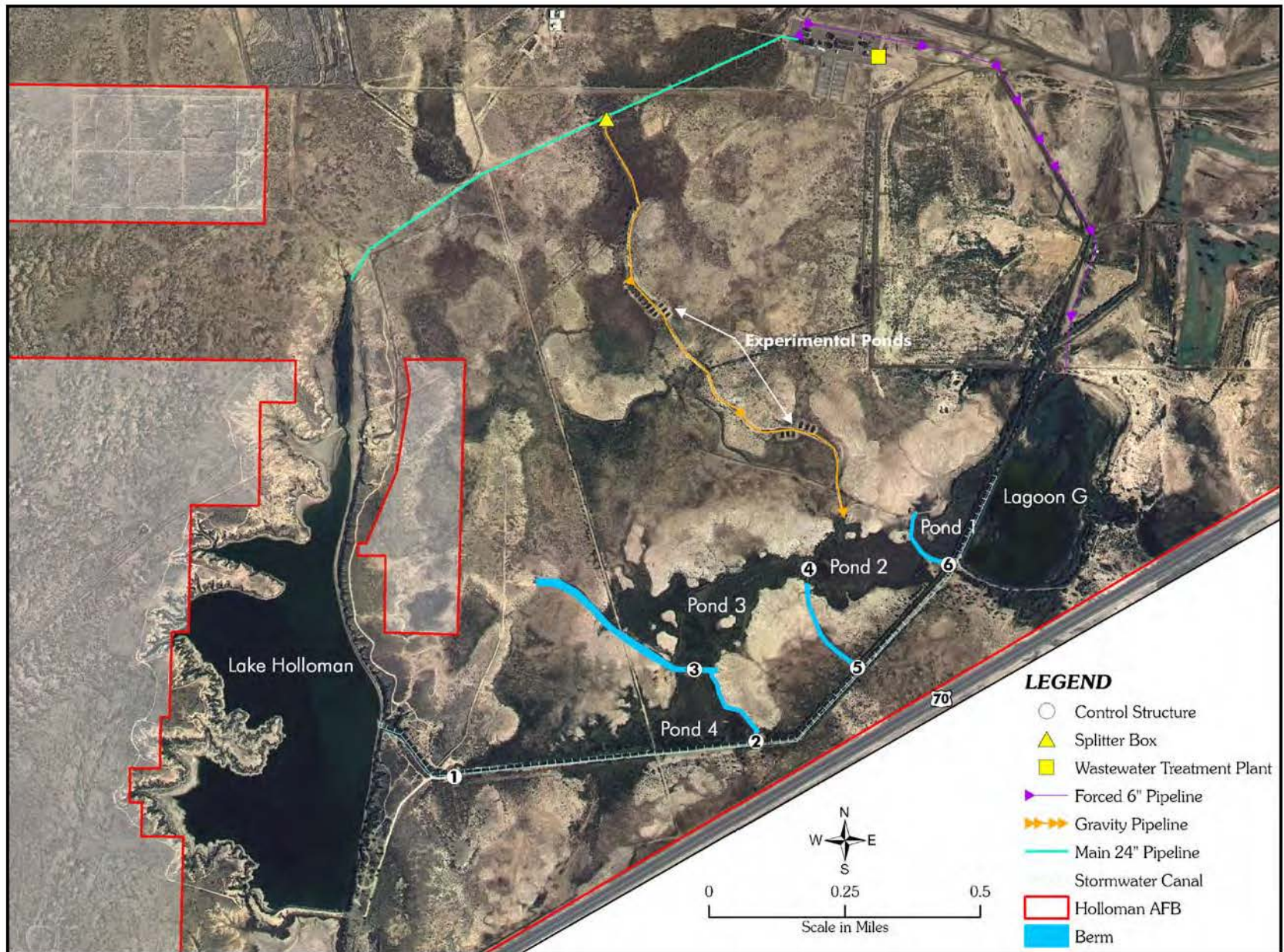
Proposed Lake Holloman Water Recreation Area Development



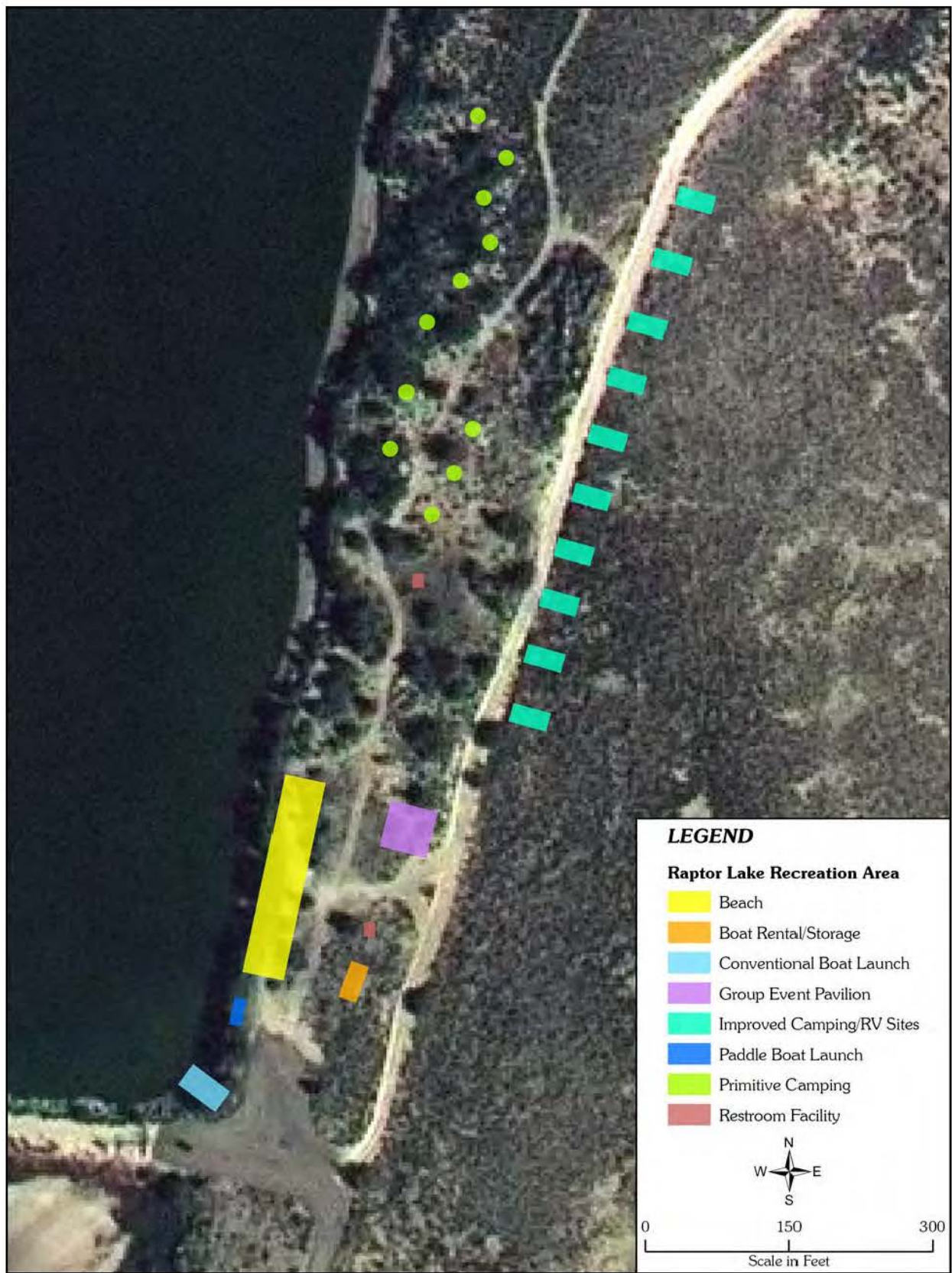
**Regional Location of Holloman AFB**



# Lake Holloman Wetland Complex







Overview of the Project Area



## IICEP Letter Distribution List

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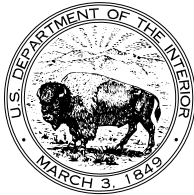
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# United States Department of the Interior

NATIONAL PARK SERVICE  
White Sands National Monument  
P.O. Box 1086  
Holloman AFB, NM 88330



IN REPLY REFER TO:

November 12, 2008

Colonel Stephen DiFonzo  
Commander, Mission Support Group, 49<sup>th</sup> Fighter Wing  
490 First Street, Suite 2650  
Holloman AFB, NM 88330

Dear Colonel DiFonzo,

We are pleased to provide technical assistance to Holloman Air Force Base as Raptor Lake is expanded for additional recreational opportunities. With water being such a precious commodity in the desert, Raptor Lake represents a great local recreational opportunity.

Additionally, we are very interested in trying to better reach out to the residents of Holloman. With its outstanding scenery and wonderful recreational opportunities, White Sands National Monument plays an important role in assuring a high quality of life in the area for local residents. It is our hope that airmen and women stationed at Holloman fondly remember New Mexico's White Sands throughout their lives.

One way we can reach out to Holloman's residents is to conduct ranger-led bird walks periodically at Raptor Lake, as we have previously discussed. Lagoon G is known as a hot spot for migratory birds, especially wading birds, which are not frequently found in the area. We hope to begin leading bird walks in January, or once the road leading to Lagoon G is repaired.

Holloman AFB already has invested a great deal of effort into planning for the development of Raptor Lake, and the project is clearly off to a very positive start. We offer the following comments as suggestions and hope they are constructive. We certainly recognize that incorporating all of them may not be possible given Holloman's financial, mission, and operational constraints.

As a matter of prioritization, the most immediate priorities would be to develop restrooms, day use facilities (picnic tables and grills), and orientation signage. The existing launch ramp is adequate for non-motorized watercraft. However, if motorized craft are going to be allowed it would need to be upgraded beforehand. Secondly, a beach/swimming area could be developed, along with a group use area and primitive campsites. As your initial conceptual plans indicate, it makes sense to develop RV sites with full hookups last.

While we recognize that the water quality of Raptor Lake is very good, some visitors may have questions about its quality since it is treated water. Therefore, we recommend that the issue of water quality and odor be addressed through some kind of wayside exhibit onsite. In addition, the odor associated with the ponds can be reduced by adding oxygen. We highly recommend that you consider installing aerators to add oxygen to the water, thus reducing the odor.

Our experience indicates there is definitely a demand for camping in the area. Many visitors come to White Sands National Monument expecting to find camping facilities, which we currently are not able to provide. Some of these visitors would certainly take advantage of Raptor Lake if camping facilities were provided there.

Because of Raptor Lake's close proximity to Highway 70, we suggest charging a small fee for camping. This would help insure that the lake's predominant overnight visitors are those who are there to take advantage of the water-based recreational opportunities, and prevent the area from turning into an overnight stop for motorists or trucks that are not there for recreational purposes but are looking for a free place to spend the night.

Depending on expected lake level fluctuations, consider relocating the visitor facilities to the opposite side of Raptor Lake. This would provide for more gradual water depths, enhancing safety for swimmers. However, if the depth of Raptor Lake is expected to fluctuate significantly, it could cause some facilities to be left "high and dry," as a foot of water depth may expose 50 linear feet of previously submerged lands.

Since many of the users of Raptor Lake are likely to be local residents, we would expect day users to make up the bulk of Raptor Lake's visitors. Therefore, we suggest including separate day use facilities, including picnic tables, ramadas if funding allows, and restrooms. The conceptual plans indicate that a group event pavilion is to be included for larger groups.

With the intense UV light in the desert, wayside signage often will not survive for very a long time. However, we have had a great deal of success with a product known as "high pressure laminate." These are used outside our visitor center and have so far lasted approximately 10 years, without noticeable deterioration.

Raptor Lake's relatively small size makes it ideal for canoeing, kayaking, paddle boating, fishing, bird watching, etc. We would suggest considering a horsepower limitation on boats to reduce conflicts between visitors if motor boats are permitted.

In the interest of safety, we suggest maintaining some spatial separation between the boat launch (assuming motorized boats are permitted) and the swimming area. Both areas should be identified as no-wake zones.

Consider adding a watchable wildlife platform at Lagoon G and on Raptor Lake. These would also provide space for other activities – such as a location for Holloman's biology or science classes to take a short field trip to study the natural environment. Ideally, the wildlife viewing platforms might include mounted spotting scopes to help visitors view birds.

Holloman AFB has had a very aggressive saltcedar removal program. We recommend removing the saltcedar in the visitor use areas of Raptor Lake. Saltcedar often provides habitat for snakes and mice, and it does not provide any shade. Instead, consider planting native species that ultimately will provide shade and bird habitat, such as Rio Grande cottonwood and/or Gooding willow. The Natural Resources Conservation Service in Los Lunas, New Mexico, operates the New Mexico Plant Materials Center, which offers native plants for sale. A sensitive landscape design will also help to reinforce the park-like atmosphere of Raptor Lake.

I hope these comments are useful. We are happy to provide further assistance as plans for the area mature. In the meantime, please don't hesitate to contact me if you have specific questions about products or vendors we may have used. You or your staff can reach me at 575-679-2599, ext 210.

Sincerely,

Kevin Schneider  
Superintendent

cc: Mr. Wesely J. Westphal, 49 CES/CEAO







BILL RICHARDSON  
Governor

NEW MEXICO  
ENVIRONMENT DEPARTMENT

*Office of the Secretary*

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RON CURRY  
Secretary  
Jon Goldstein  
Deputy Secretary

November 13, 2008

A. David Budak, Deputy Base Civil Engineer  
Department of the Airforce  
49 CES/CEA  
550 Tabosa Avenue  
Holloman AFB, NM 88330-8458

**RE: Environmental Assessment for Lake Holloman Recreation Area Development**

Dear Mr. Budak:

Your letter regarding the above named project was received in the New Mexico Environment Department (NMED) and was sent to various Bureaus for review and comment. Comments were provided by the Air Quality, Ground Water Quality and Surface Water Quality Bureaus and are as follows.

**Air Quality Bureau**

The Air Quality Bureau has evaluated the information submitted with respect to the Develop recreational facilities at Lake Holloman, Holloman AFB, Otero County. Otero County is considered to be in attainment with all New Mexico and National Ambient Air Quality Standards.

To further ensure air quality standards are met, applicable local or county regulations requiring noise and/or dust control must be followed; if none are in effect, controlling construction-related air quality impacts during projects should be considered to reduce the impact of fugitive dust and/or noise on community members.

Potential exists for temporary increases in dust and emissions from earthmoving, construction equipment, and other vehicles; however the increases should not result in non-attainment of air quality standards. Dust control measures should be taken to minimize the release of particulates due to vehicular traffic and construction. Areas disturbed by the construction activities, within and adjacent to the project area should be reclaimed to avoid long-term problems with erosion and fugitive dust

All asphalt, concrete, quarrying, crushing and screening facilities contracted in conjunction with the proposed project must have current and proper air quality permits. For more information on

certification is issued by the state of New Mexico to ensure the project will not adversely impact the state of New Mexico's water quality standards (*State of New Mexico Standards for Interstate and Intrastate Surface Waters, New Mexico Water Quality Control Commission, 20.6.4 NMAC, As amended August 1, 2007*).

#### **USEPA Construction General Permit Issues**

The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction projects (common plans of development) that will result in the disturbance (or re-disturbance) of one or more acres, including expansions, of total land area. Since this project exceeds one acre, it will require appropriate NPDES permit coverage prior to beginning construction (note: one to five acre construction projects may be able to qualify for a small construction waiver in lieu of permit coverage – for information on this option see Appendix D in CGP and USEPA's website below).

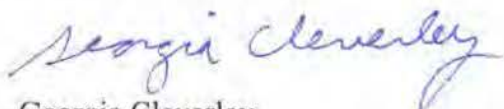
Among other things, the Construction General Permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (re-vegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. In addition, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 9.C.1 in CGP).

You should also be aware that USEPA requires that all "operators" (see Appendix A in CGP) obtain NPDES permit coverage for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications (in this case, the United States Air Force) and the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the SWPPP and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

The CGP was re-issued effective July 1, 2003 (see **Federal Register/Vol. 63, No. 128/Monday, June 30, 2008**). The CGP, Notice of Intent (NOI), Fact Sheet, Federal Register notice, and information on the small construction waiver can be downloaded from the following USEPA website: <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>.

I hope this information is helpful to you.

Sincerely,



Georgia Cleverley  
Environmental Impact Review Coordinator  
NMED File #2757

From: Santiago\_Gonzales@fws.gov [[mailto:Santiago\\_Gonzales@fws.gov](mailto:Santiago_Gonzales@fws.gov)]  
Sent: Monday, December 01, 2008 1:24 PM  
To: Britton, Lonnie J Civ USAF ACC 49 CES/CEAN  
Subject: EA for Lake Holloman Recreation Area Development  
Importance: High

Lonnie, I have been out of the office during the past two weeks and could not comment on the Lake Holloman Recreation Area Development project. I have the following comments and hope you will consider them during the preparation of the draft environmental assessment.

- 1) Consider prohibiting the use of live bait while fishing. The use of live bait in other lakes throughout the state and the country has had devastating effects to native fish. Some of these bait fish may be predatory or out compete the White Sands pupfish.
- 2) Roads and parking lot should be sloped away from the lake to prevent petroleum products from entering the lake. Petroleum products can pollute the lake's water and cause harm to invertebrates and fish.
- 3) Consider conducting construction outside the migratory bird nesting season.
- 4) Consider placing bat boxes near the lake. The placement of bat houses placed near Lake Holloman would encourage the use of bats as biological control agents.

I am looking forward to commenting fully on the Draft Environmental Assessment.



49 CES/CEAO

550 Sahara Ave.

HAFB NM 88330-8458

Wesley J. Westfall

and) A. David Budak

Deputy Base Civil Engineer

Sally Walker  
Hal Walker

Alamogordo, NM 88501

Subject: Environmental Assessment for Lake Halloran  
Recreation Area Development

In the manner of introduction, may I say - I (we) am (are) owners / leasees / operators of ranch lands bordering HAFB on the west, south and east sides of HAFB since 1971. The leases used to include all the area N of HWY 90 W past HAFB. Around 1990, State Land Office transferred some acreage to HAFB in Sec 21 T17S R8E. Later BLM followed with the transfer of acreage in Secs 21-22-27-28. Also some decided acreage in Sec 28. Recently a fence was erected on acreage S of HWY 90 W in Sec 33. The reason given to us, was, 'The land was contaminated and toxic from the HAFB sewer and the medical experiments concerning the Apes. One disease actually identified to us was HIV.

It has alarmed me, that we were never aware of any clean up project of these harmful waste products.

Questions 1) Was there a clean up of which we were unaware?  
2) When and how was this accomplished?

Since we have owned White Sands Ranch (S of HAFB) we have changed the watering habitat of the cattle to encourage their grazing further south of the area involved, leaving this contamination mentioned above.

Question 3) If there 'were' a cleanup, why were we not informed?



2003 the Alameda City Commission declared a "drought emergency." At that time they condemned and confiscated my water wells, for the municipal water supply, which included HAFB. Located Sec 35 T17S R9E.

Question 4) Where will the water come from to support a playground such as you describe in your letter?

I have done some exhaustive research this past month contacting representatives of the State Land Office.

Mr. Jim Jackson is the manager of the leasing dept. BLM, Mr. Leticia Lester manager of surface div. and ~~Mr.~~ Chris Teske, agent representing our lease.

VMEX Hazardous Waste Bureau of L.C. and Patty Rains (or Reyes - unclear)

Mr. Chris Corder (Cargy - unclear) a NM State Biologist.

None of those mentioned above, were aware of any "clean up project." The NM Biologist said he had made a scientific study, doing extensive lab work & found calcium sulfate & hydrogen sulfide, causing the odors and skin irritation of which he personally suffered during his collections. His recommendations were building expensive desalination and chilling plants. He also mentioned a meeting with Col. M. McSee and other dignitaries giving them his position on this, which was a "mildlife habitat."

The make up of this area is gypsy and saline. The water is unusable for cattle and humans. One cattle water on better water pumped from nine miles to the east.

There is a natural spring on the crest of a hill in Sec. 28.

This is an example of the underground water.

Question 5) Why was I not notified of this meeting?

It is unclear from your records.

Question 6) How close to the deeded land, (and it appears to be marked as property of HAFB) ?

- Question 7) How close to the HWY would be the entrance? 3
- 8) If this goes forward what are the civilian business opportunities?

Our concerns are valid. We would appreciate a second and third investigation as to whether or not this project is worthwhile.

We are totally anti another government run bottomless pit money operation.

You may contact me for a conversation at any time.  
[REDACTED] And I respectfully request a copy of the DEA, and a notice of the public meeting.

Sally Walker







## DEPARTMENT OF GAME AND FISH

Post Office Box 25112

Santa Fe, NM 87504

Web Site Home Page: <http://www.wildlife.state.nm.us>

Fax: (505) 476-8128

Conservation Services Division Phone No.: (505) 476-8101

# FAX

To: Wesley Westphal From: Terra Manasco  
Fax: 575-572-5080 Pages: 4 (Including cover)  
Phone: \_\_\_\_\_ Date: 12.02.08  
Re: \_\_\_\_\_ CC: \_\_\_\_\_

☐ Urgent    ☐ For Review    ☐ Please Comment    ☐ Please Reply    ☐ Please Recycle

• Comments:

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GOVERNOR  
Bill Richardson



DIRECTOR AND SECRETARY  
TO THE COMMISSION  
Tod Stevenson

Robert S. Jenka, Deputy Director

STATE OF NEW MEXICO  
DEPARTMENT OF GAME & FISH

One Wildlife Way  
Post Office Box 25112  
Santa Fe, NM 87504  
Phone: (505) 476-8008  
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Visit our website at [www.wildlife.state.nm.us](http://www.wildlife.state.nm.us)  
For information call: 505/476-8000  
To order fish publications call: 1-800-862-9310

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Leo V. Sims, II, Commissioner  
Hobbs, NM

01 December 2008

Mr. Wesley J. Westphal  
49 CES/CEV  
550 Tabosa Avenue  
Holloman AFB, NM 88330-8458

Re: Lake Holloman Recreation Area Development; Pre-draft Environmental Assessment  
NMDGF No. 12349

Dear Mr. Westphal:

The New Mexico Department of Game and Fish (Department) has received the notice for the development of the Environmental Assessment (EA) for Lake Holloman Recreation Area Development. According to information provided in the letter, the proposed action would consist of developing approximately three acres on the southeastern portion of Lake Holloman for facilities to support recreational opportunities such as boating, swimming and fishing for Holloman Air Force Base (HAFB) personnel and the surrounding community. The EA will also address another alternative (not defined in notice) and a No Action alternative.

The Department commends HAFB efforts to develop recreation opportunities in the Tularosa Basin and encourages completion of a thorough and comprehensive EA. The basin is home to many endemic species whose survival relies on maintaining many elements of the existing ecosystem. As the EA is crafted, the Department encourages HAFB to work with natural resources professionals, including those with the Department, to appraise the benefits of expanded recreation against threats to native flora and fauna.

The Department has identified several areas of potential environmental impact that should be addressed in the EA. Of foremost significance is assessment of the impact on state-listed (threatened) White Sands pupfish *Cyprinodon tularosa*, managed under the Cooperative Agreement for Protection and Maintenance of White Sands Pupfish (Cooperative Agreement, <http://www.wildlife.state.nm.us/conservation/documents/WhiteSandsPupfishCoop.pdf>). White Sands pupfish is the only fish endemic to the endorheic Tularosa Basin and occurs in four

Westphal  
Dec. 1, 2008  
Page -2-

disjunct (two native and two replicated) populations on HAFB, White Sands Missile Range (WSMR) and White Sands National Monument (WSNM). The extremely geographic range of the White Sands pupfish makes it vulnerable to extinction from natural and anthropogenic causes. In the Cooperative Agreement HAFB commits to (page 6):

- Prohibit the transport and introduction of any live non-native aquatic organisms to aquatic habitats on HAFB. Furthermore, aquatic habitats within HAFB not currently inhabited by White Sands pupfish shall not be considered for establishment of non-native aquatic organisms without prior conference and consent by USFWS and NMDGF.
- Cooperate with the signatory agencies in the inventory and removal of specifically identified populations of non-native fauna within HAFB to prevent the potential contamination of habitats or populations of White Sands pupfish.
- Coordinate all unclassified activities proposed for implementation within Essential Habitat and Limited Use Areas with the signatory agencies to prevent negative impacts to White Sands pupfish or its habitat and review current project activities to ensure that no potential negative impacts to the species or its habitat are impending. Monitor all unclassified activities within Essential Habitat and Limited Use Areas on HAFB to ensure that no negative impacts occur.
- Evaluate all classified project activities that may affect the White Sands pupfish or its habitat and ensure that no negative impacts to the species or its habitat will occur. Monitor all classified activities within Essential Habitat and Limited Use Areas on HAFB to ensure that no negative impacts occur.

The Department is concerned that expanded recreation on HAFB may increase threats to White Sands pupfish. Although the proposed action does not include activities in White Sands pupfish habitat, expanded recreation at Lake Holloman increases opportunity for human-assisted fish movement, either introduction of non-native sport or bait fish into White Sands pupfish habitats or movement of White Sands pupfish from their established habitats for use as baitfish. In addition to introduction of nonnative fish, there is also potential for introduction of other aquatic invasive species, such as quagga mussels, on recreational equipment. The New Mexico Aquatic Invasive Species Management Plan

<http://www.wildlife.state.nm.us/documents/NMStateAISMGmtPlanFinalOct08.pdf> can provide additional information.

Supporting recreation for the surrounding community as well as HAFB personnel further increases these threats. The Department suggests that the EA specifically address these threats and provide appropriate protections. Additionally, the Department encourages HAFB to conference with the U.S. Fish and Wildlife and the Department White Sands Pupfish Conservation Agreement representatives concerning species importation for angling opportunities.

Westphal  
Dec. 1, 2008  
Page -3-

We appreciate the opportunity to comment on this project. Should you have any questions regarding our comments, please contact Stephanie Carman, Aquatic Species Recovery Coordinator, at (505) 476-8092, or [stephanie.carman@state.nm.us](mailto:stephanie.carman@state.nm.us)

Sincerely,

*Terra Manasco*

for  
Matthew Wunder, Ph.D.  
Chief, Conservation Services Division

MW/sc

cc: Wally Murphy (Ecological Services Field Supervisor, USFWS)  
David Propst (Endangered Fish Biologist, NMDGF)  
Stephanie Carman (Aquatic Recovery Plan Coordinator, NMDGF)  
Mark Watson (Conservation Services Habitat Specialist, NMDGF)  
Mike Sloan (Fisheries Chief, NMDGF)  
Shawn Denny (Fisheries Biologist, NMDGF)  
Jill Wick (Aquatic Habitat Specialist, NMDGF)



PO Box 1645  
Las Cruces, NM 88004

December 18, 2008

Mr. Wesley J. Westphal  
49 CES/CEAO  
550 Tabosa Avenue  
Holloman AFB, NM 88330-8458

RE: Proposed Lake Holloman Recreation Area Development

Dear Mr. Westphal;

We at Mesilla Valley Audubon Society have grave concerns about the proposed Recreation Area Development of Lake Holloman and the associated wetlands located there.

This area has been recognized and designated as an Important Bird Area by the National Audubon Society and BirdLife International. The wetlands there are important for migrating neo-tropical birds and as a nesting area for the Western Snowy Plover (recognized as a sensitive species by New Mexico Dept of Game and Fish, etc) as well as many other species. Many migrating birds such as waterfowl, shorebirds, passerines (song birds) and wading birds use the wetlands as an important resting or wintering area and food source on their way to nesting sites to the north and wintering areas in Mexico and Central America. Holloman Lake and its associated wetlands are located central to their migrating routes and the only one for many miles. It has been considered one of the 3 most important sites for migrating waterfowl and shorebirds in New Mexico.

The lake and wetlands are very important for supporting local species diversity and the rapid loss of wetlands is one of our most important conservation issues. Distinguished Harvard University Biologist, Edward O. Wilson notes that the loss of biodiversity and the subsequent extinctions are one of the planet's greatest threats. The direct loss of habitat for the birds and other species contributes to an overall loss of biodiversity, as do the potential indirect impacts of increased recreation at Holloman Lake. The removal of salt cedar trees along the wetlands, although an invasive and noxious plant, contributes to the overall loss of species habitat. We don't disagree with the removal of an invasive plant such as Salt cedar, but recommend replacing with native vegetative cover (e.g., shrubs, trees, emergent vegetation) as a mitigation measure.

Because of the condition and quality of waters at Holloman Lake, we question the use of the waters for human recreation, other than fishing or hunting.

**We are a conservation and natural history organization in Southern New Mexico that promotes appreciation and conservation of birds, other wildlife, and habitat, through environmental education, issue advocacy and natural history experiences.**

We are concerned about the direct impacts from the development of the sites (hard camping spots, RV, boat launch, storage, etc) and then the indirect and direct impacts of people recreating ON THE WATER.

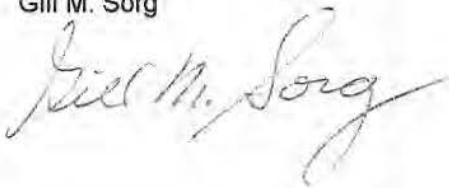
Birding or hunting or maybe even fishing from the shore as we and everyone currently does, has a much lesser impact on breeding, wintering and migrating birds. Being out on the water would only cause more harassment of waterfowl and shorebirds and behaviors would be interrupted, etc.

MVAS has biological expertise with bird species found at Holloman Lake and we would be happy to work with Holloman AFB to develop a recreational plan/and/or strategy for the Holloman Lakes. Ours would include developing the site as a premier bird watching facility, and outdoor education facility (water quality, native plant restoration, bird monitoring, etc). We would need more information to make adequate recommendations for the current plan, because we feel that they are lacking. Such as: seasonality of recreation: will camping be year-round? When will hunting be allowed and will other recreation be curtailed at that time? Will any of these overlap with bird breeding season, or other important times of their lives (migratory fat build up, etc).

There are other very successful wetland enhancement sites in the southwest such as Tucson's Sweetwater Marsh, the site or two in Phoenix, and the facility at Las Vegas, NV -- where they all used sewage effluent and created wetland treatment ponds and turned them into some of the most visited recreation sites in these urban areas.

MVAS and Audubon New Mexico will be willing to assist in planning with our many years of experience in conservation.

Respectfully,  
Gill M. Sorg

A handwritten signature in cursive script that reads "Gill M. Sorg". The signature is written in dark ink and is positioned below the typed name.

**We are a conservation and natural history organization in Southern New Mexico that promotes appreciation and conservation of birds, other wildlife, and habitat, through environmental education, issue advocacy and natural history experiences.**



## **APPENDIX B**

### **AIR QUALITY**



## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

$\mu\text{g}/\text{m}^3$	Micrograms Per Cubic Meter
<b>ACAM</b>	Air Conformity Applicability Model
<b>AGL</b>	Above Ground Level
<b>CAA</b>	Clean Air Act
<b>CFR</b>	Code of Federal Regulations
<b>CO</b>	Carbon Monoxide
<b>CY</b>	Calendar Year
<b>EAC</b>	Early Action Compact
<b>ETS/CEM</b>	Emission Tracking System/Continuous Emissions Monitoring
<b>HAPs</b>	Hazardous Air Pollutants
<b>lb</b>	Pounds
$\text{mg}/\text{m}^3$	Milligrams per cubic Meter
<b>mm</b>	Millimeter
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NEI</b>	National Emissions Inventory
<b>NO<sub>2</sub></b>	Nitrogen Dioxide
<b>NO<sub>x</sub></b>	Nitrogen Oxides
<b>O<sub>3</sub></b>	Ozone
<b>Pb</b>	Lead
<b>PM<sub>2.5</sub></b>	Particulate Matter With a Diameter Less Than or Equal to 2.5 Microns
<b>PM<sub>10</sub></b>	Particulate Matter With a Diameter Less Than or Equal to 10 Microns
<b>ppm</b>	Parts per Million
<b>PSD</b>	Prevention of Significant Deterioration
<b>PTE</b>	Potential to Emit
<b>ROI</b>	Region of Influence
<b>SER</b>	Significant Emissions Rate
<b>SIP</b>	State Implementation Plan
<b>SO<sub>2</sub></b>	Sulfur Dioxide
<b>TP</b>	Target Practice
<b>TSP</b>	Total Suspended Particulate
<b>USEPA</b>	U.S. Environmental Protection Agency
<b>VOC</b>	Volatile Organic Compounds
<b>yr</b>	Year
<b>MDEP</b>	Massachusetts Department of Environmental Protection



## AIR QUALITY

This appendix presents an overview of the Clean Air Act (CAA) and the state of New Mexico air quality program. The appendix also discusses emission factor development and calculations, including the assumptions used for the air quality analyses presented in the Air Quality sections.

### *Air Quality Program Overview*

In order to protect public health and welfare, the U.S. Environmental Protection Agency (USEPA) has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for six “criteria” pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQS: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 Code of Federal Regulations [CFR] 50).

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The New Mexico Environment Department (NMED) Air Quality Bureau (aqb) administers the state’s air pollution control program under the authority of the Federal Clean Air Act and Amendments, Federal Regulations, and State laws.

New Mexico has adopted more stringent standards than the NAAQS for carbon monoxide, nitrogen dioxide, sulfur dioxide, total suspended particulates, hydrogen sulfide, and total reduced sulfur. Federal standards are utilized for particulate matter and ozone. The federal and state of New Mexico ambient air quality standards are presented in Table B-1.

Based on measured ambient air pollutant concentrations, the USEPA designates areas of the United States as having air quality better than (attainment) the NAAQS, worse than (nonattainment) the NAAQS, and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are “unclassifiable” and are treated as attainment until proven otherwise. Attainment areas can be further classified as “maintenance” areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. All areas of the state are in compliance with the NAAQS.

**Table B-1. Summary of National and State Ambient Air Quality Standards**

Criteria Pollutant	Averaging Time	Federal Primary NAAQS(8)	Federal Secondary NAAQS (8)	New Mexico Standards
Carbon Monoxide (CO)	8-hour(1)	9 ppm (10 mg/m <sup>3</sup> )	No standard	8.7 ppm
	1-hour(1)	35 ppm (40 mg/m <sup>3</sup> )	No standard	13.1 ppm
Lead (Pb)	Quarterly	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>	No standard
Nitrogen Dioxide (NO <sub>2</sub> )	Annual	0.053 ppm (100 µg/m <sup>3</sup> )	0.053 ppm (100 µg/m <sup>3</sup> )	0.05 ppm
	24-hour	No standard	No standard	0.10 ppm
Particulate Matter ≤10 Micrometers (PM <sub>10</sub> )	Annual	Revoked	Revoked	No standard
	24-hour(2)	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No standard
Particulate Matter <2.5 Micrometers (PM <sub>2.5</sub> )	Annual(3)	15 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No standard
	24-hour(4)	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No standard
Ozone (O <sub>3</sub> )	1-hour(7)	0.12 ppm (235 µg/m <sup>3</sup> )	0.12 ppm (235 µg/m <sup>3</sup> )	No standard
	8-hour(5)	0.075 ppm (2008 std)		
	8-hour(6)	0.08 ppm (1997 std) (157 µg/m <sup>3</sup> )	0.08 ppm (157 µg/m <sup>3</sup> )	
Sulfur Dioxide (SO <sub>2</sub> )	Annual	0.03 ppm (80 µg/m <sup>3</sup> )	No standard	0.02 ppm
	24-hour(1)	0.14 ppm (365 µg/m <sup>3</sup> )	No standard	0.1
	3-hour(1)	No standard	0.50 ppm (1300 µg/m <sup>3</sup> )	No standard
Total Suspended Particulates (TSP)	AGM	No standard		60 (µg/m <sup>3</sup> )
	30-day			90 (µg/m <sup>3</sup> )
	7-day			110 (µg/m <sup>3</sup> )
	24-hour			150 (µg/m <sup>3</sup> )
Hydrogen Sulfide (H <sub>2</sub> S)	1-hour	No standard		0.010 ppm
Total Reduced Sulfur	1/2 hour	No standard		0.003 ppm

Source: USEPA 2008 (Federal Standards); 310 CMR 6.00, 2008 (Massachusetts Standards)

ppm = parts per million

mg/m<sup>3</sup> = milligrams per cubic meter

µg/m<sup>3</sup> = micrograms per cubic meter

(1) Not to be exceeded more than once per year.

(2) Not to be exceeded more than once per year on average over 3 years

(3) To attain this standard, the 3-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m<sup>3</sup>

(4) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup> (effective December 17, 2006)

(5) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

(6) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard-and the implementation rules for that standard -will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard

(7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

(b) As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

(8) Standard is expressed in a statistical form so that determination of attainment will be made when the expected number of days per calendar year with maximum hourly average concentrations above 235 µg/m<sup>3</sup> (0.12 ppm) is equal to less than one.

A general conformity analysis is required if (1) the action's direct and indirect emissions have a potential to emit (PTE) one or more of the six criteria pollutants at or above emission rates shown in Table B-2 or Table B-3, or (2) the action's direct and indirect emissions of any criteria pollutant represent 10 percent of a nonattainment or maintenance area's total emissions inventory for that pollutant.

**Table B-2. Emission Rates for Criteria Pollutants in Nonattainment Areas\***

Pollutant		Emission Rate (tons/year)
Ozone (Volatile Organic Compounds [VOCs] or NO <sub>x</sub> )		
	Serious nonattainment areas	50
	Severe nonattainment areas	25
	Extreme nonattainment areas	10
	Other ozone nonattainment areas outside an ozone transport region	100
Marginal and moderate nonattainment areas inside an ozone transport region		
	VOC	50
	NO <sub>x</sub>	100
CO: All nonattainment areas		100
SO <sub>2</sub> or NO <sub>2</sub> : All nonattainment areas		100
PM <sub>10</sub>		
	Moderate nonattainment areas	100
	Serious nonattainment areas	70
PM <sub>2.5</sub>		
	Direct emissions	100
	SO <sub>2</sub>	100
	NO <sub>x</sub> (unless determined not to be a significant precursor)	100
	VOC or ammonia (if determined to be significant precursors)	100
Pb: All nonattainment areas		25

Source: USEPA 2006

\**De minimus* threshold levels for conformity applicability analysis.

**Table B-3. Emission Rates for Criteria Pollutants in Attainment (Maintenance) Areas\***

Pollutant		Emission Rate (tons/year)
Ozone (NO <sub>x</sub> , SO <sub>2</sub> , or NO <sub>2</sub> ): All maintenance areas		100
Ozone (VOCs)		
	Maintenance areas inside an ozone transport region	50
	Maintenance areas outside an ozone transport region	100
CO: All maintenance areas		100
PM <sub>10</sub> : All maintenance areas		100
PM <sub>2.5</sub>		
	Direct Emissions	100
	SO <sub>2</sub>	100
	NO <sub>x</sub> (unless determined not to be a significant precursor)	100
	VOC or ammonia (if determined to be significant precursors)	100
Pb: All maintenance areas		25

Source: USEPA 2006

\**De minimus* threshold levels for conformity applicability analysis.



Each state is required to develop a state implementation plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons/year based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B-4 provides a tabular listing of the PSD significant emissions rate (SER) thresholds for selected criteria pollutants (USEPA 1990).

**Table B-4. Criteria Pollutant Significant Emissions Rate Increases Under PSD Regulations**

Pollutant	Significant Emissions Rate (tons/year)
PM <sub>10</sub>	15
PM <sub>2.5</sub>	10
Total Suspended Particulate (TSP)	25
SO <sub>2</sub>	40
NO <sub>x</sub>	40
Ozone (VOCs)	40
CO	100

Source: Title 40 CFR Part 51.

The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B-5. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. The areas surrounding Eglin Air Force Base and Hurlburt Field are classified as Class II. Currently, there are no designated Class III areas in the United States.

**Table B-5. Federal Allowable Pollutant Concentration Increases Under PSD Regulations**

Pollutant	Averaging Time	Maximum Allowable Concentration ( $\mu\text{g}/\text{m}^3$ )		
		Class I	Class II	Class III
PM <sub>10</sub>	Annual	4	17	34
	24-hour	8	30	60
SO <sub>2</sub>	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO <sub>2</sub>	Annual	2.5	25	50

Source: Title 40 CFR Part 51

The Monitoring section of the Air Quality Bureau monitors ambient air throughout our jurisdiction (all of New Mexico except tribal lands and Bernalillo County). The EPA has determined the criteria pollutants to be monitored; ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter, and lead. Ambient concentrations of these contaminants are compared to the health-based National Ambient Air Quality Standards. Recently, EPA has placed particular emphasis on the monitoring of ozone and fine particulate matter because these two pollutants have been found to be the cause of increasing respiratory problems, especially asthma. Lead monitoring in the state was discontinued in 1998 because our monitored levels were consistently below detection limits.

The Bureau maintains 30 separate monitoring sites across the state, each monitoring one or more of the criteria pollutants. The majority of the Bureau's monitors are located in Dona Ana County, especially along the border with El Paso and Juarez. This area has received increased attention because of higher pollutant concentrations, especially of ozone and particulate matter. Also, increased resources are available on the border because of federal government interest. San Juan County has the next highest number of monitoring stations. Ozone levels measured as 8-hour average concentrations were approaching, though not surpassing, the EPA's new standard in recent years. In other counties around the state, ambient monitoring is performed according to need.

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

## Regulatory Comparisons

In order to evaluate the air emissions and their impact to the overall region of influence (ROI), the emissions associated with the construction activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality

were then identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for non-attainment and maintenance areas, and although all counties considered in the analysis are attainment areas for the NAAQS, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of the proposed actions emissions.

To provide a conservative evaluation, the impacts screening in this analysis used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual parish potentially impacted, which is a smaller area.

## **Project Calculations**

### ***Construction Emissions***

Calculations for construction emissions were completed using the calculation methodologies described in the U.S. Air Force Air Conformity Applicability Model (ACAM). As previously indicated, a conformity determination is required since Otero County is designated as "nonattainment" for ozone and attainment for all other criteria pollutants.

The ACAM was used to provide a level of consistency with respect to emission factors and calculations. The ACAM evaluates the individual emissions from different sources associated with the construction phases. These sources include grading activities, asphalt paving, construction worker trips, stationary equipment (such as saws and generators), nonresidential architectural coatings, and mobile equipment emissions (Air Force 2003).

The proposed action calls for the construction and clearing of land for the Lake Holloman recreation area development.

### ***Grading Activities***

Grading activities are divided into grading equipment emissions and grading operation emissions.

Grading equipment emissions are combustive emissions from equipment engines and are calculated in the following manner:

$$VOC = .22 \text{ (lb/acre/day)} * \text{Acres} * DPY_1/2000$$

$$NO_x = 2.07 \text{ (lb/acre/day)} * \text{Acres} * DPY_1/2000$$

$$PM_{10} = .17 \text{ (lb/acre/day)} * \text{Acres} * DPY_1/2000$$

$$CO = .55 \text{ (lb/acre/day)} * \text{Acres} * DPY_1/2000$$

$$SO_2 = .21 \text{ (lb/acre/day)} * \text{Acres} * DPY_1/2000$$

Where: Acres = number of gross acres to be graded during Phase I construction  
 DPY<sub>1</sub> = number of days per year used for grading during Phase I construction  
 2000 = conversion factor from pounds to tons

All emissions are represented as tons per year.

Grading operation emissions are calculated using a similar equation from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003). This calculation includes grading and truck hauling emissions.

Emission Calculation:

$$PM_{10} \text{ (tons/yr)} = 60.7 \text{ (lb/acre/day)} * \text{Acres} * DPY_1 / 2000$$

Where: Acres = number of gross acres to be graded during Phase I construction  
 DPY<sub>1</sub> = number of days per year used for grading during Phase I construction  
 2000 = conversion factor from pounds to tons

The calculations assumed that there were no controls used to reduce fugitive emissions. Also, it was assumed that construction activities would occur within one calendar year (CY) in which the project would be implemented (365 days), and that grading activities would represent 50 percent of that total, or 182 days. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

### **Architectural Coatings**

Non-residential architectural coating emissions are released through the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings.

Emission Calculation:

$$VOC_{SF} \text{ (lb/yr)} = (SQR\_GRSQF * 1.63) / 2000$$

Where: SQR\_GRSQF = square root of gross square feet of nonresidential building space to be constructed in the given year of construction  
 1.63 = emission factor  
 2000 = conversion factor from pounds to tons

It was assumed that construction activities would occur within 365 days. After subtracting the grading activities from the estimated overall construction time, the actual construction period was reduced to 182 days. The specified square footage was assumed. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

## ***Asphalt Paving***

Volatile organic compound (VOC) emissions are released during asphalt paving operations.

Emission calculation:

$$VOC_{PT} \text{ (tons/yr)} = (2.62 \text{ lb/acre}) * \text{Acres Paved}/2000$$

Where: Acres Paved = total number of acres to be paved at the site.

2000 = conversion factor from pounds to tons

It was assumed that approximately 1.5 acres would be paved with asphalt. The specific emission factors used in the calculations were available through the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

## ***Construction Worker Trips***

Construction worker trips during the construction phases of the project are calculated and represent a function of the number of residential units to be constructed and/or square feet of commercial construction.

Calculation:

$$\text{Trips (trips/day)} = .42 \text{ (trip/unit/day)} * \text{Area of training facilities}$$

Total daily trips are applied to the following factors depending on the corresponding years.

Year 2005 through 2009:

$$VOC_E = .016 * \text{Trips}$$

$$NO_{x_E} = .015 * \text{Trips}$$

$$PM_{10_E} = .0022 * \text{Trips}$$

$$CO_E = .262 * \text{Trips}$$

Year 2010 and beyond:

$$VOC_E = .012 * \text{Trips}$$

$$NO_{x_E} = .013 * \text{Trips}$$

$$PM_{10_E} = .0022 * \text{Trips}$$

$$CO_E = .262 * \text{Trips}$$

To convert from pounds per day to tons per year:

$$VOC \text{ (tons/yr)} = VOC_E * DPY_{II}/2000$$

$$NO_x \text{ (tons/yr)} = NO_{x_E} * DPY_{II}/2000$$

$$PM_{10} \text{ (tons/yr)} = PM_{10_E} * DPY_{II}/2000$$

$$CO \text{ (tons/yr)} = CO_E * DPY_{II}/2000$$

Where: Commercial construction = total square footage of construction projects to be constructed in the given year of construction

2000 = conversion factor from pounds to tons

DPY<sub>II</sub> = number of days per year during Phase II construction activities

It was estimated that the total square footage of construction would be 5,780 square feet. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

### **Stationary Equipment**

Emissions from stationary equipment occur when gasoline-powered equipment (e.g., saws, generators, etc.) are used at the construction site.

Emission Calculations:

$$VOC = .198 * (GRSQFT) * DPY_{II}/2000$$

$$NO_x = .137 * (GRSQFT) * DPY_{II}/2000$$

$$PM_{10} = .004 * (GRSQFT) * DPY_{II}/2000$$

$$CO = 5.29 * (GRSQFT) * DPY_{II}/2000$$

$$SO_2 = .007 * (GRSQFT) * DPY_{II}/2000$$

Where: GRSQF = gross square feet of commercial buildings to be constructed during Phase II

DPY<sub>II</sub> = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

It was estimated that the total square footage of construction would be 5,780 square feet. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003). The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (U.S. Air Force, 2003).

### **Mobile Equipment**

Mobile equipment (such as forklifts and dump trucks) emissions include pollutant releases generated by the equipment during Phase II construction.

Emission Calculations:

$$VOC = .17 * (GRSQFT) * DPY_{II}/2000$$

$$NO_x = 1.86 * (GRSQFT) * DPY_{II}/2000$$

$$PM_{10} = .15 * (GRSQFT) * DPY_{II}/2000$$

$$CO = .78 * (GRSQFT) * DPY_{II}/2000$$

$$SO_2 = .23 * (GRSQFT) * DPY_{II}/2000$$

Where: GRSQF = gross square feet of training area to be constructed during Phase II

DPY<sub>II</sub> = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

It was estimated that the total square footage of construction would be 5,780 square feet. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003). The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

## National Emissions Inventory

The NEI is operated under the USEPA's Emission Factor and Inventory Group, which prepares the national database of air emissions information with input from numerous state and local air agencies, tribes, and industries. The database contains information on stationary and mobile sources that emit criteria air pollutants and hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country on a yearly basis. The NEI includes emission estimates for all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county-level estimates for area, mobile, and other sources, are currently available for years 1996 and 1999 for criteria pollutants and HAPs.

Criteria air pollutants are those for which the USEPA has set health-based standards. Four of the six criteria pollutants are included in the NEI database:

- Carbon Monoxide (CO)
- Nitrogen Oxides (NO<sub>x</sub>)
- Sulfur Dioxide (SO<sub>2</sub>)
- Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)

The NEI also includes emissions of VOCs, which are ozone precursors, emitted from motor vehicle fuel distribution and chemical manufacturing, as well as other solvent uses. VOCs react with nitrogen oxides in the atmosphere to form ozone. The NEI database defines three classes of criteria air pollutant sources:

- Point Sources. Stationary sources of emissions, such as an electric power plant, that can be identified by name and location. A "major" source emits a threshold amount (or more) of at least one criteria pollutant and must be inventoried and reported. Many states also inventory and report stationary sources that emit amounts below the thresholds for each pollutant.
- Area Sources. Small point sources such as a home or office building or a diffuse stationary source such as wildfires or agricultural tilling. These sources do not individually produce sufficient emissions to qualify as point sources. Dry cleaners are one example; for instance, a single dry cleaner within an inventory area typically will

not qualify as a point source, but collectively the emissions from all of the dry cleaning facilities in the inventory area may be significant and therefore must be included in the inventory.

- Mobile Sources. Any kind of vehicle or equipment with a gasoline or diesel engine (such as an airplane or ship).

The following are the main sources of criteria pollutant emissions data for the NEI:

- For electric generating units—USEPA's Emission Tracking System/Continuous Emissions Monitoring Data (ETS/CEM) and Department of Energy fuel use data.
- For other large stationary sources—state data and older inventories where state data were not submitted.
- For on-road mobile sources—the Federal Highway Administration's estimate of vehicle miles traveled and emission factors from USEPA's MOBILE Model.
- For non-road mobile sources—USEPA's NONROAD Model.
- For stationary area sources—state data, USEPA-developed estimates for some sources, and older inventories where state or USEPA data were not submitted.
- State and local environmental agencies supply most of the point source data. USEPA's Clean Air Market program supplies emissions data for electric power plants.

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